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PREFACE

Personal computers first became available to agriculture in 1978. Their potential for widespread application to business management was almost immediately obvious. Interest in microcomputers as a tool has grown at a phenominal rate, yet actual adoption remains in the 3 - 6% range.

One of the barriers to microcomputer adoption is the fact that adopters are actually learning three technologies at once: the computer, the application software, and the application. We started the monthly newsletter, Compu-Farm, in February 1980 to help adopters overcome these obstacles.

The newsletter was started with some apprehension. Would the newsletter be accepted? Are we working with too small a group of farmers and being too elite? The success of Compu-Farm in terms of acceptance and subscription numbers has dispelled those fears. Best of Compu-Farm Volumes 1 to 3 was first published in March, 1984. Best of Compu-Farm Volumes 1 to 4 followed in 1985, and this year, we are releasing Best of Compu-Farm Volumes 1 to 8. In the following pages, we hope to present the reasons for Compu-Farm's success: good basic information and candid comment.

Like any good piece of material, Compu-Farm is the result of a team effort focused on one goal - to produce the best independently produced newsletter on ag-computing. I would like to recognize the efforts of some of those people on the team. To Wilson Loree, Branch Head, and Keith Brown, former Supervisor of the Farm Planning Section, for making the whole exercise possible. To Gerd Andres and Gary Fisher, former editors of Compu-Farm. To all who have submitted articles. To Deborah Oschvalda, research assistant for the Management Technology Unit, for sorting throught all eight volumes, and organizing articles that were still relevant. To Beth Lausen, Lori Riabko and Peggy Good for their invaluable typing skills. To Anita Lunden, Maggie Lamb, and Arlene Douglas for eagle-eyed editing. And finally to all the other office staff for the mundane tasks of addressing and stuffing envelopes.

Bruce Waldie, Editor
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Farm Business Management Branch
Olds, Alberta

January, 1989

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VOLUME I, NO. 1, 1980

Although many of the requirements have changed, the article can still be used as a reference for new computer users. Seasoned operators will find it interesting from a historical point of view.

JARGON CORNER

BIT: A single binary digit, can be either off (no voltage) or on (voltage present). They take the values 0 and 1 and can be arranged into groups called "bytes".

BYTE: A group of 8 bits that are treated as a unit. 1 byte can contain one character such as an "!" or an "A" or even a space " ". It can also represent an integer number from -127 to +127. Larger numbers need more bytes. Approximately 1000 bytes is referred to as 1k, thus 32k is about 32,000 bytes (32,768 exactly).

COMPUTER BUSES: A bus is the set of electrical lines that form the internal communication lines of the computer. Along these lines are transmitted data and directions to memory and other peripherals. In microcomputers, the more standard the bus, the easier it is to add memory and other peripherals. Many of the low end personal computers such as APPLE, PET, and TRS-80 have their own bus structure. This means that memory or disk drives that plug into one brand will not work on another. One becomes locked into one brand and switching brands can be expensive. However, there is one microcomputer bus which has become a standard of the Institute of Electrical and Electronics Engineers (IEEE). It is called the S-100 bus. Machines which use this bus structure have interchangeable cards which can contain memory, disk or printer controllers. There are more independent manufacturers producing for S-100 than any other bus. In fact, rumour has it that the latest generation of IBM microcomputers will use this bus as well. The need to remain flexible when buying hardware is a must. If the manufacturer goes belly-up or simply stops making computers, a standard bus will keep your system running longer. If a manufacturer gets enough market power (Apple and IBM) their bus becomes a de-facto standard.

COMPUTER LANGUAGE: The computer normally works in a special language called machine language. It is programmed into the computer one byte at a time and is extremely difficult for the non-expert to use. Fortunately, the people who are experts have written programs in machine language which translates from easily comprehended instructions (see Learn To Program In BASIC section) to something the computer can understand. These programs are called high level languages. There are two kinds of high level languages: compilers and interpreters. The computer takes the program written in high level language (called the source program) and translates it all at one time into machine language (called the object program). One then runs only the object program since the compiler is not needed. Languages like FORTRAN and COBOL are normally compilers.

The interpreter translates and runs the source program line by line. Thus both the interpreter and the source program must be in memory at the same time; no object program is produced. BASIC and APL are interpreters.

The compiler produces a fast and memory-efficient object program, but the compiler makes it hard to work the bugs out of a given source program. The interpreter makes programs easy to debug and can be put onto ROM for instant use when the machine is turned on.

DISKS: For smaller computers the most common form of data storage is the floppy disk. It is like a thin 45 RPM record enclosed in a flat, square hardboard liner. The most common sizes are 5 1/4 inch and 8 inch diameter. They can hold from 50k to 1000k bytes of data. They are improvements on cassettes in the area of speed and reliability. For really big data storage jobs, there is the hard disk. This is a disk that is sealed within a box. The storage capacities of this disk range from 10 megabytes to 40 megabytes (a megabyte (M) is 1000k bytes).

Although the initial cost is high, the cost per byte of storage is lower than floppy disks. However, this unit has one disadvantage. When you fill up the disk you have to dump the excess onto many floppy disks or buy another hard disk or erase the data you do not need. In all cases, tapes and disks can be erased and new data can be placed on them.

How Disks Work

A disk system is composed of a **controller** and the actual **disk drive.** One controller can usually handle up to four disk drives, but usually cannot function without a program in the computer called the **DOS** (Disk Operating System). This program occupies up to 10k of memory which is the reason you need more memory to run disks. DOS allows you to store and retrieve programs or data, get lists (directories) of programs on the disk, destroy old programs and data and many other functions.

There are three kinds of **disk drives** available for micros, they are the 5 1/4", 8" and hard disks. The 5 1/4" size (5 1/4" describes the diameter of the disk used) is the most common. It can store from 80k to 300k bytes on a diskette. How do they do this? Let's look inside one and see. When you push the diskette into the drive and close the door, several things happen. A device looking like a mushroom head engages the large hole in the centre of the diskette. This grips the diskette and starts turning at about 300 RPM. The read-write head starts moving out of the mechanism to engage the disk surface along a slot in the diskette sleeve (the diskette is, of course, circular and is inside a square sleeve).

The system of storing data along the disk is like a phonograph record. On a TRS-80 Model 1 disk system, data is laid out electrically in 35 concentric circles (called **tracks**). Each track is then subdivided into 10 **sectors** (like 10 slices of a pie). Each sector can contain 256 bytes. One track (usually track 17) is set aside for the directory of the programs on the disk. Thus the total amount of data that can be stored on a 35 track - 10 sector per track diskette is 34 x 10 x 256 = 37,040 bytes. How do we get more data on a diskette? The disk drives may be able to lay down 40 or 77 tracks or have more sectors on the outer tracks than the inner ones or store more than 256 bytes on a sector. They may also have a read-write head on the other side of the disk. This doubles the recording surface and thus doubles the amount of storage. The important thing to remember is that the greater the number of tracks, the closer the data is together. This requires higher quality (and more expensive) disk drives. You may have heard the terms single and double density and double sided. These can be defined by the number of tracks and recording surfaces. **Single density** has 35 to 40 tracks; **double density** has 77 tracks, **double sided** records on both sides of the disk. Each format needs the diskette that is designed for that format. These different formats explain why you cannot take a disk from a TRS-80 and plug it into an APPLE or PET.

Let's look at some rules of handling diskettes to prolong their life and reduce the chances of grief in the long run. It's important to realize that the read/write head actually touches the disk surface. This means any foreign substance, even a fingerprint, will scratch both the disk surface and the read/write head. The first rules are ones of handling:

Grip the diskette from the edge away from the read/write slot and return the diskette to its sleeve immediately after use. Although the diskette is called floppy, do not bend or force it harshly into the disk drive.

Since the diskette is magnetic, the second rule warns against magnetic fields: Don't leave diskettes on anything that contains a power supply or CRT. TRS-80 owners, this means no resting diskettes on the disk drives! It is best to put unused diskettes in a box or folder some distance from any electrical device.

The third rule is environment related: Store diskettes at room temperature if possible (they have a range between 10 and 50 deg. C.) and out of direct sunlight (they can warp in a car). Depending on the use and the fact that the read/write head touches the surface, diskettes may only last three months, so **MAKE BACKUPS OFTEN!**

My final hint is to warn about the increasing tendency to use both sides of the diskette. This can be done by cutting some new holes in the sleeve and turning the diskette over. Not that it can't be done, since most manufacturers coat both sides with oxide to the same thickness. The problem lies with the direction of spin of the disk. With double sided drives, the disk always spins in the same direction. The inside of the sleeve contains a soft fibre that traps dust particles just like a lint brush. Now how do you remove dirt from a lint brush? You brush in the opposite direction. When you turn the diskette over to use the second side, the same effect occurs. The main surface rotates in the opposite direction to the cleaning surface and the dust is dislodged, grinding it into the oxide. Result, loss of important data. In computers, as in anything else, one can be penny wise and pound foolish.

MEMORY: This is the total amount of storage available to the computer. In this area are stored programs and the numbers you need to process. Some storage is temporary and usually disappears after the power is turned off. This is called Random Access Memory (RAM). Read Only Memory (ROM) holds permanent programs like the BASIC language. This cannot be changed except at the factory.

Most microcomputers have from 8 to 64k of RAM and from 8 to 32k of ROM. The total amount of memory in a microcomputer (called the address space) cannot exceed 64k because of the way the chips are built. Thus RAM and ROM compete for space (not so much of a problem in today's 16 bit computers with 1 MG of memory space). **How Memory Works:** I want to go into more detail how the computer stores and retrieves data from its memory. Memory is like a long bank of mail boxes, eight rows high and up to 64,000 columns long. In each box is either a one or zero (voltage or no voltage) bit. Looking down the column will give an 8 bit byte. Each column is identified by a number from 0 to 64,000. When the computer wants something out of memory, it calls for the memory column and looks in the 8 mailboxes. The data bits are communicated back and further along a data bus eight lines wide (one for each bit). Some memory can only be read, while other memory can be altered by the computer. However, the directions to memory to select the correct columns are communicated along an address bus. The address bus has 16 lines, each transmitting a bit. Why 16? In the binary number system, 16 zeros give the number 0 but 16 1's is the number 65535 (hence the total address space of a micro being 64k). Thus to get the byte at location 15347, the sequence 0011011011110011 is transmitted down the address bus. You can test your RAM memory and even locate a defective chip by using your new found knowledge and a map of where your RAM memory is located.

PERMANENT STORAGE: When you turned off the power to the computer, the information contained in RAM disappeared. If you want this saved permanently, you must record the information on tapes or disks. This involves copying the information from the RAM to the tape. This process does not disturb the information already in RAM. When you want the information back again, the process is reversed and the information on the tape is not disturbed.

PRINTERS: (What to look for!) Microcomputer printers can be classified into two categories; dot matrix and solid typeface. The dot matrix printer uses a matrix of dots to form a character on paper. This paper could be either regular paper, specialized aluminized or heat treated paper. When the printer uses regular paper, the dots are formed by firing pins connected to solenoids through a ribbon onto the paper. If the printer uses special paper, the dots are small heating elements which either burn off an aluminum coating or change a dye. The solid typeface uses a ball (like a Selectric) or a wheel with each letter on a petal (like a flower). This wheel spins around and a little hammer hits the right letter as it goes by. This is called a daisy wheel printer. The dot matrix printer is faster and cheaper than the solid typeface; however, it does not produce the same character quality. Here are some things to look for in a printer:

- If it is a dot matrix, what is the density of the dots? A minimum of 5 x 7 or 5 dots across and 7 dots down. The higher the density, the better the characters look.

- Can it print lowercase letters? The cheapest models can only print uppercase. If the printer can print lowercase, can it print g's, q's and y's with their tails below the line? These are called descenders. Many people find that letters without descenders are difficult to read. Descenders are associated with higher dot matrix densities like 9 x 12.

- What is the speed in characters per second (CPS)? A dot matrix should be no slower than 30 CPS, the average seems to be 80-100 (CPS). However, don't just look at CPS figures. Do an actual count of how may 60-80 character lines can be printed in 15 seconds to get a lines-per-minute count (LPM). Some printers may have high CPS ratings, but have inefficient paper feed and carriage return mechanisms and thus may be slower than printers with lower CPS ratings. A printer that prints in both directions (bi-directional) will tend to be faster than one that only prints left to right.

- Listen to the printer. Could you put up with its sound for a whole day? Microcomputers are so marvelously quiet, why spoil your system with a screaming printer.

- For business purposes, try to get a printer that will print at least 80 characters across an 8 1/2 inch page. This is industry standard although some software may require 132 characters per line. Some printers can compress 132 characters into an 8 1/2 inch wide line.

- Does the printer use roll feed, sprocket feed (tractor feed) or single sheets of paper? Sprocket feed paper will be held straight while printing long reports or forms.

R-F INTERFERENCE: R-F stands for radio frequency interference, and all computers produce it. Although not dangerous, it can play havoc with your TV and FM reception. R-F interference shows up as a garbled noise on FM and a houndstooth pattern on TV screens. The farther out one gets in a TV fringe reception area, the worse the interference gets. There are very few effective remedies, but one of the simplest is to place the computer as far away from the TV antenna or antenna wires as possible. Making sure the computer is grounded helps as well. Contact the Federal Department of Communications for more information on solving this problem.

TAPES: The most common kind of tape storage is the normal audio cassette. This has the advantage of being cheap, but cassette recorders make you press the button and adjust the volume controls. For business purposes these cassettes have two disadvantages. They are slow because the tape only moves at 1 7/8 inches per second. This can be annoying when you have a large amount of data to transfer. However, the greatest problem is one of reliability; data can be easily lost using cassettes.

The next kind of tape unit is the tape cartridge. It is designed specifically for computers and is found in HP-85's and IBM-5110's. It is both fast and reliable.

WORD: In general, the longer the word length, the faster the machine can work with numbers. Most microcomputers have a word length of 8 or 16 bits (1 or 2 bytes).

Provides useful and detailed information for anyone wanting to program in BASIC.

LEARN TO PROGRAM IN BASIC

The standard language of microcomputers is called BASIC. You enter your directions to the computer in this language with a series of sentences called statements. Each statement is given a number. The computer will go from statement to statement in ascending order of the numbers. Example:

```
1 clean out the barn
2 fix the tractor
```

Indicates that you want the barn cleaned out before fixing the tractor. The computer does not care what the numbers are just as long as the second one is larger. Example:

```
100 clean out the barn
2012 clean up
3574 have lunch
```

Thus, statement numbers give the computer the order of the things you want done. For example, if you want to clean up before lunch, the sentence would be numbered between 2012 and 3574. Example:

```
2012 fix the tractor
3000 clean up
3574 have lunch
```

As you may have guessed, the above statements would probably mean nothing to the computer. We are going to learn some of the grammar of BASIC.

PRINT - This allows the computer to communicate with you by printing on the screen or the printer. To print something, you enclose it in quotation marks after the **PRINT**.

Example:
to print HELLO! on the screen - 10 PRINT "HELLO" is a program to do this. Every time the computer prints something, the next print statement will print on the next line.

Example:

```
10 PRINT   "HELLO"
20 PRINT   "THERE"
will be:
HELLO
THERE
```

You can stop this happening by putting a semi-colon at the end of the first print statement. This will cause the next piece of material to be printed in the next available space:

Example:

```
10 PRINT   "HELLO";
20 PRINT   "THERE"
is: HELLOTHERE
```

Note how it runs the words together. Question? How would you correct these statements so the words do not run together?

Answer:

Put a space either after HELLO or before THERE!

Example:

```
PRINT "HELLO ";
PRINT "THERE"
is: HELLO THERE
```

No. 2, March, 1980

Variables are the slots where the computer stores the numbers. This allows you to use any numbers you want. A program that could only use one set of numbers would be pretty useless. Now reach back into your memory for some algebra. Computers obey the same laws of algebra as we do.

The computer is just like a calculator; you plug in the numbers and it cranks out the answer. It cannot solve a system of equations unless it has been programmed to do so.

The symbols which BASIC uses are:

- + for addition
- - for subtraction
- * for multiplication
- / for division, example 6/2=3

and ↑ or ** for exponentiation, example 3**2 = 9 (3 squared)

When the computer evaluates a formula, it will take the numbers and variables to the right of the equal sign, calculate the value and assign it to the variable to the left of the equal sign.

Let's write a program:

```
10 X = 2
20 Y = 4
30 Z = X * Y ** 2
40 PRINT Z
```

Several concepts were introduced here. We can write numbers as part of the program and assign them to variables. These numbers do not change and are called constants. The number calculated for Z is 32, not 64. The computer has a hierarchy of operations which it follows when it calculates equations: it is 1) parenthesis, 2) special functions (like logs), 3) exponentiation, 4) multiplication and division and 5) addition and subtraction. The use of parenthesis will change the hierarchy for example.

(X * Y) ** 2 will calculate X * Y first "8" and then square it to 64. Of course, you could have several levels of parenthesis with the deepest level done first, example ((X + Y) * Z) ** 2 will do X + Y first, multiply by X and then square the result.

Finally we can print out the value of the number within the variable.

Thus, if Z = 32 then PRINT Z will give 32, but PRINT "Z" will give Z (since everything within the quotes will be printed exactly as written). We also could have had

```
    40 PRINT "THE ANSWER IS "; Z
```

which would have printed

```
    THE ANSWER IS 32
```

Now let's write a program which will give the value of $1000 kept in the bank at 12% interest compounded annually for 10 years. The formula for this is:

$$FV = PV\ (1 + i)^n$$

where FV is the future value of the deposit, PV is the present value ($1000), i is the interest rate divided by 100 (.12 or 12/100) and N is the number of years the amount will be kept. The program would be:

```
10 P = 1000
20 I = 12/100
30 N = 10
40 F = P* (1+I)**N
50 PRINT"THE FUTURE VALUE IS $";F
60 END
```

Problem: Rewrite the program so you can find the present value of $1000 paid in 10 years with an interest rate of 12%.

No. 3, April, 1980

Answer:

```
10 P = 1000
20 I = 12/100
30 N = 10
40 P = F/(I + 1)**N
50 PRINT"THE PRESENT VALUE IS $";F
60 END
```

The statement that allows the computer to get information from you is:

```
INPUT varlist
```

The varlist may be one variable or several separated by commas. Example INPUT A or INPUT A,B,C.

The computer will print a question mark on the screen and wait for you to type in the number. However, if the program has a list of variables, you must enter in each value separated by a comma. Example, when the computer executes INPUT A,B,C - you must type in 25, 37, 50 after the question mark to fulfill the requirements of the statement.

The statements:

```
10 PRINT"ENTER YOUR AGE"
20 INPUT A
```

will look like:

```
ENTER YOUR AGE
?
```

If you wish the question mark to be on the same line as the question, end the question with a semi-colon ";". This will cause the question mark to be printed on the next available print position. Thus:

```
10 PRINT"ENTER YOUR AGE";
20 INPUT A
```

gives: ENTER YOUR AGE?

If you rewrite the future value program so that you can plug in any values, replace lines 10 to 70 with:

```
10 PRINT "ENTER THE PRESENT VALUE";
20 INPUT P
30 PRINT "ENTER THE INTEREST RATE";
40 INPUT I
50 I=I/100
60 PRINT "ENTER THE TERM IN YEARS";
70 INPUT N
```

The program continues on as before.

No. 4, May, 1980

Programs work from the first instruction until they end or run out of instructions. The ability to change the flow of a program is called branching. There are two kinds of branching - conditional and unconditional.

CONDITIONAL BRANCHING: Assume you are deciding what kind of wine to buy for supper (a favorite topic). Generally, red wine goes with beef while white wine goes with fish or poultry. Thus in the liquor store, you say to yourself:

if we are eating beef, **then** I will buy red wine **if** we are eating fish or poultry, **then** I will buy white wine **if** we eat none of the above, **then** I will buy beer.

The conditional branch in BASIC says - IF a condition is true, THEN branch to a line number. If the condition is false, we drop through to the next line. What exactly is the condition that can be true or false? It is when a variable is equal to, less than, or greater than a number. The symbols BASIC uses are:

= for equals
< for less then, example: 3<5
> for greater than, example: 5>3
< = (or = <) for less than or equal to
= > (or > =) for greater than or equal to
< > (or > <) for not equal to

Let's construct a program using conditional branching to print out the odd numbers between 1 and 50:

```
10 N=1
20 PRINT N
30 N=N+2
40 IF N < 50 THEN 20
50 END
```

Line 40 asks if N is less than 50. If it is, then we branch to line 20 which prints N. Line 30 increments N by 2 and then the question is asked again. When N reaches 51, it no longer meets the condition of line 40. The program falls through to line 50 and ends. Thus on a conditional branch, one can go two ways.

1. Meet the condition and branch to a line, or
2. Fall through and execute the next instruction.

This month's question:

Rewrite the future value program so that it evaluates the future value of $1000 for 10 years using interest rates from 10% to 20% inclusive. (10%, 11%, 12% etc.)

Answer:

```
10 P=1000
20 I=10/100
30 N=10
40 F= P*(1+I)**N
50 PRINT "THE FUTURE VALUE IS$";F
60 I=I + .01
70 IF I < .20 THEN 40
80 END
```

Note that we add .01 to I because I is now divided by 100.

No. 5, June 1980

UNCONDITIONAL BRANCHING: Conditional branching gave the program a choice on whether to branch or not. Unconditional branching always makes the program branch. The format of this statement is:

GOTO line number

The GOTO statement is often combined with the IF THEN statement. For example, let us say you have a decision point where either you do one block of lines or another complete block of lines but not both. It looks like this:

```
      10 IF A=I THEN 2000
20
↕     these lines done if A=I
1000
2000
↕     these lines done if A=I
3000
4000
↕     rest of program
```

What happens when you have finished the lines ending at 1000? You will then start to execute lines 2000. But you should only do this when A=I! To get around lines 2000 to 3000 you insert a GOTO 4000 at line 1010. This will branch around lines 2000 to 3000.

This month's question:

This is a hard one. Rewrite the future/present value programs (see Vol. I, No. 3) so that they take in the years and interest rate from the keyboard. Ask if you want present value or future value (hint: enter a 1 for present value) get the appropriate input and calculate the answer. Then ask if the user wants to run the program again with 0 for No. 1 for YES.

```
10 PRINT "ENTER THE INTEREST RATE";
20 INPUT I
30 I = I/100
40 PRINT "ENTER THE TERM IN YEARS";
50 INPUT N
60 PRINT "ENTER 1 TO CALCULATE PRESENT VALUE, 0 FOR
FUTURE VALUE";
70 INPUT T
80 IF T = 1 THEN 110
90 IF T = 0 THEN 160
100 GOTO 200
110 PRINT "ENTER THE FUTURE VALUE";
120 INPUT F
130 P = F/(1+I) ** N
140 PRINT "THE PRESENT VALUE IS $";P
150 GOTO 200
160 PRINT "ENTER THE PRESENT VALUE";
170 INPUT P
180 F = P * (1+I) ** N
190 PRINT "THE FUTURE VALUE IS $";F
200 PRINT "DO YOU WANT ANOTHER?1 = YES, 0 = NO"
210 INPUT T
220 IF T = 1 THEN 10
230 IF T = 0 THEN 250
240 GO TO 200
250 END
```

Note the sequence of lines 80 - 100 and 230 - 250 excludes any other answer but 1 or 0, this is called idiot proofing.

No. 6, July, 1980

LOOPING: The sequence I = 1, I + 1, IF I = N, THEN line # is a way of executing a set of statements more than once (N times in fact). We did this in June's exercise. BASIC has a statement which allows us to define these loops in an easier manner. It is:

FOR (variable) = (number or variable or expression) **TO** (number or variable or expression) **STEP** (number or variable or expression)

From the above, the statement is FOR I - 1 to N STEP 1. However all machines assume to STEP is 1 if you leave it out, thus FOR I = 1 to N will do the job. There is a second statement to the loop. It is NEXT (variable). This tells the machine the end of the statements you want to loop around. Let's go back to May's question.

```
10  P = 1000
20  N = 10
30  FOR I = .1 to .2 STEP .01
40  F = P * (1+I) ** N
50  PRINT "THE FUTURE VALUE IS $";F
60  NEXT I
70  END
```

We could have written 30 & 40 as 30 FOR I = 10 TO 20
 40 P * (1+i/100) **N

We can also do loops within loops. For instance, to calculate some combinations of interest rates and terms one could have:

```
10  P = 1000
20  FOR N = 1 TO 10
30  FOR I = 10 TO 20
40  F = P * (1 + I/100) ** N
50  PRINT "THE FUTURE VALUE IS $";F
60  NEXT I
70  NEXT N
```

Note that lines 30 - 60 compose the inner loop and lines 20 - 70 compose the outer loop. The order of calculations will be all interest rates for each term e.g. N = 1, I = 10...20, N = 2, I = 10...20. It is very important that the NEXT statements follow the proper sequence. Thus the inner loop NEXT must come before the outer loop's NEXT. An easy way to check for this is to draw a line from each FOR statement to its corresponding NEXT statement. If the lines cross then you do not have the proper order e.g.

```
FOR N =
NEXT N =

FOR I =
NEXT I =
```

This month's question:

Devise a table that calculates net price after allowance for cattle shrinkage in dollars per hundred weight, from 65 - 70 dollars in 50 cent increments with shrinkages of 2, 4, 6, and 8 percent. Lay out the table so that shrinkage percentage is across the top and base prices run down the side. e.g.

```
Base Price     Shrink %        2     4      6      8

   65            63.7        63.7  62.4  61.1   59.8
```

Answer:

```
10 PRINT "Base Price Shrink %       2     4     6  8"
20 FOR X=65 TO 70 STEP .5
30 PRINT " ";X;"
40 FOR Y=2 TO 8 STEP 2
50 PRINT X-X*Y/100;" ";
60 IF X < > 8 THEN 80
70 PRINT " "
80 NEXT Y
90 NEXT X
```

Note lines 60 and 70 are to make sure that the next price starts on a new line. Thus, if Y=8 (the last shrink percentage) line 70 prints without a semicolon, in effect doing a carriage return/line feed.

No. 7, August, 1980

This month we will clear up some details about printing, branching and variables. In the answer to last month's question, we printed spaces to have some separation between the different numbers. This allows us to have FORMATTED OUTPUT which pleases to the eye. There are shortcuts which allow the same effect. The first is the **TAB** function. Its syntax is:

TAB (number, variable or function)
e.g. TAB(10) TAB(X) TAB(X-Y*5)
The value within the brackets is the column at which the printing is to commence from. In the above program, line 30 could have been written as:

```
30  PRINT TAB(3); X;TAB(19);
```

Since printing columns of numbers usually requires that the numbers line up either the decimal points or the first characters (called left justified), judicious use of TABS can do this. There is also an easy way to line up numbers if there are not too many columns. One can use a comma instead of a semi-colon in the print statements. The comma will cause the computer to tab over to its internal pre-set tabs, usually 8-14 spaces apart.

We had always used a conditional branch as IF (condition) THEN (line #). Most microcomputer BASIC'S allow the syntax IF (condition) GOTO (line #). The IF-THEN statement can be used for more powerful uses, the executable conditional. This allows any statement to follow the THEN (and in most machines which allow multiple statements, more than 0). For instance, look at the answer to June's question. Line 230 was IF T = 0 THEN 250, where 250 was the END. We should have been able to say IF T = 0 THEN END and saved one statement. The fewer the branches, the more readable the program becomes.

The final concept we will explore is the STRING VARIABLE. This variable stores letters (and digits) instead of numbers. Up until now we have written programs that used numbers exclusively. Of course these are not the only things you will want to store with a computer. Names, dates, places and things are some of the possibilities. A string variable is designated by a dollar sign after the letter(s) e.g. A$ B1$ AA$. One assigns the letters or digits (called alphanumerics) to the string variable with an equals sign e.g. A$="hello". The alphanumerics must be enclosed in double quotes just like a print statement. You can make one string equal to another A$=B$ and do comparisons on them IF A$="Gary" GOTO 250. Now you can answer yes or no to questions rather than 1 or 0.

No. 8, September, 1980

This is our last lesson of the series. This month we will cover the subroutine. The subroutine is a set of lines that could have been duplicated several times through the program, but are instead collected into one group. For instance:

```
500 INPUT X
510 IF X < = 0 THEN 540
520 OF X > 100 THEN 540
530 GOTO 570
540 PRINT "SORRY THIS IS NOT CORRECT!"
550 PRINT "TRY AGAIN"
560 GOTO 500
```

This routine will place limits on the value of X. If you had 25 inputs, all with pre-determined limits, you would have 175 lines just for this function alone. The same 7 lines of code would be repeated for each question.

However, these lines are the same except: 1) the variable imputed will change and 2) the upper and lower limits may change. The procedure we can use to economize on lines is the subroutine. Its syntax is GOSUB line number in the main program with the end of the subroutine marked by RETURN. The line number is the first line of the subroutine. In our example, the main program has:

```
500 H=L
510 L=0
520 GOSUB 2000
530 X5=X
```

We have defined the limits with H and L. Why line 530? Because the GOSUB returns with a value for X, we have 25 different variables into which the value of X must be transferred. The subroutine is:

```
2000 INPUT X
2010 IF X < = L THEN 2040
2020 IF X > H THEN 2040
2030 RETURN
2040 PRINT "SORRY THIS IS NOT CORRECT!"
2050 PRINT "TRY AGAIN"
2060 GOTO 2000
```

Notice the RETURN does not have to be the last statement in a subroutine. Logically though, the RETURN is the last statement in the subroutine since this is the only way to exit back to the main program. When you return from a subroutine, the line after the calling line (which has the GOSUB) is the next line to be executed (line 530 here).

In our example, we have saved 68 lines by using this subroutine. Just remember, the more a program jumps around either by subroutines or gotos, the more unreadable it gets. It may not be a problem to you, but somebody else that may use the program can have no end of troubles figuring it out.

VOLUME 1, NO. 3, APRIL, 1980

Stresses the software's value as a labor and money saving device.

"CANNED SOFTWARE"

Besides accounting systems, what other software might be useful with an on-farm computing system?

You may have considered using the computer to keep track of your physical records. These would be things like livestock performance, yields, machinery repair costs. These kinds of applications make the computer act like a filing cabinet. Programs could be written for each individual application or a general program can be written to handle most applications. This general program is called a "database manager". With such a program, you can define the kind of data that will be stored, enter and retrieve it with no programming experience required. Any data that could be entered on a card under one animal or field or machine is suited for the database. After the data is entered, you can retrieve it with commands such as "find cows with milk production less than 10000 lbs" or "show data on ear tag 134". The information could then be a tape or disk based system, although the latter would be faster for larger databases. Try to avoid programs that make you put all the data in RAM at the same time. They restrict the database size to the amount of RAM in your system. A better system would be to keep the data on the disk and only take it out when needed.

Another useful package would be something to help you do table based planning such as partial budgets, cash flow analysis or ration balancing. All of these applications require you to fill out rows and columns on a piece of paper and add them up. Programs exist which allow you to define a table of numbers and do any kind of transformation on them. If you change any number in the table, all the totals are immediately recalculated. This allows "what-if" analysis to be done very easily. If you were doing a five year cash flow and wanted to inflate the fuel cost by 15% in each year, a simple command could do this and give the new totals for each year. The data can be stored on disk for later use. An example of this kind of program is VISICALC(TM) which runs on APPLE systems (soon to be on others).

The moral of the story is to look at "canned" programs before you go off and program an application yourself. It can save a lot of time and more important, save money over a completely custom program.

VOLUME II, NO. 1, FEBRUARY, 1981

Provides a good, basic checklist for the consumer. The article is updated in Volume VI and VIII, however, this still makes for some interesting historical reading.

REVIEW OF SOFTWARE

Software is a vital part of any computer. Software controls the computer and its peripherals, and instructs the system to do your work the way you want it done. When buying software, the checklist below may help in evaluating and asking questions.

SOFTWARE CHECKLIST

General

Does it do all that I want it to do?
Memory needed?
Can the program be altered?
Backups, can I make them?
What language?
Printer required?
Available on cassette or diskette?
User's manual?
Technical manual?
Documentation adequately indexed?
Extent of training and vendor support?
Error correction procedure is simple (built-in accuracy checks)?
Does return key have to be used for each entry?
How many disks are needed?
Terminology is clear and understandable?
Price?

Inventories

Has crop inventory listings?
Has livestock inventory listings?
Has machinery inventory listings?
Has building inventory listings?
Are these communicated to financial side?
Can these be allocated by different owners?
Ease of change?

Records, Accounting & Budget

Has income statement?
Has net worth statement?
Has cash flow report?
Has balance sheet?
Depreciation schedule?
Capital purchases and sales?
Summary of principal and interest payments?
Provides for recording intra-farm enterprise transfers?
Single or double entry?
Number of accounts?
Number of journal entries per month?
Are journal entries stored on diskettes?

Breeding Records

Can retrievals be made on any attribute?
Can animals be sorted by attributes?
How many additions and changes can be made?

Crop and Livestock Records

Volume of business?
Efficiency in production (yield/acre, returns per $100 feed fed, etc.)?
Efficiency in buying and selling (price paid vs price sold)?
Marketing summary?

VOLUME II, NO. 7, AUGUST/SEPTEMBER, 1981

NEW COMPUTERS

The summer has brought some new developments which have great impact on anyone looking to buy a computer or even those that have their computer already.

There have been three new microcomputer systems announced. Two use the CP/M operating system which allows access to a wealth of (sometimes very expensive) software. The first is the XEROX 820 or **S**imply **A**mazing **M**achine. It consists of 64k memory, a Z-80 microprocessor (the same as are used in the Radio Shack Models I, II and III), a detachable typewriter style (IBM Selectric that is) keyboard, 80 x 24 line screen, 4 interfaces (2 serial and two parallel) and dual disk drives. The size of the disk drives determines the price of the system. With dual 80k, 5 1/4" disks the price is $4,500 while dual 256k 8" disks up the cost to $5,900. However, one must buy all of the system software. The operating system CP/M costs $300, BASIC costs $500, a VISICALC-like language (SUPERCALC) costs $450. These prices put the XEROX in the TRS-80 Model II range. At this time, it is being sold directly through Xerox or Computerland. It seems to be aimed at word processing rather than mass data storage as indicated by the size of the disk drive.

The HP-125 is the first Hewlett Packard which can use the CP/M operating system. It has Z-80 processor, 64k bytes of user memory, 2 serial ports, and a parallel port compatible with Commodore equipment and double sided 5 1/4" or 8" floppy disks. However, the price is as high as the quality. With dual disk drives (256k bytes per drive), the price is approximately $10,000. HP has decided to distribute the CP/M software itself and the list includes VISICALC/125, Word/125 (word processing), Graphics/125, Link/125 (a communications package) and BASIC/125, (a version of Microsoft BASIC). As anyone who has used HP equipment will tell you this machine offers superior quality but does not really compete in price terms.

Finally the IBM Personal Computer. What can you say about a product that comes from the industry's largest player? The name alone is enough to strike fear into the hearts of its competitors. However, there is more than a nameplate to this machine. It starts with an Intel 8088 processor chip which is a scaled down version of a 16 bit mini-computer. This allows theoretical expansion to one million bytes of memory, although there is only room for 256k inside the IBM's box. The detachable keyboard is organized much like the IBM Selectric and is reputed to be one of the most comfortable to use.

It has either an 80 x 24 line or 40 x 24 line screen depending on the quality of the monitor you are using. It has color graphics in four colors with 640 x 200 resolution. The most interesting point is that the IBM used a disk operating system from MICROSOFT not compatible with CP/M. The disks are 5 1/4" and stores 160k per drive, about average for a machine in its price range. The price range is certainly competitive. For a 16k starter system with no monitor, the price is about $2,150. A dual drive 48k system with B/W monitor and printer would cost approximately $6,250, software not included. The DOS, BASIC and VISICALC would run from $300 to $500 per package, although IBM will talk to you if you want to buy 20 or more. In conclusion, one can build a pretty powerful system from a relatively inexpensive base. IBM did not get to be the biggest from luck.

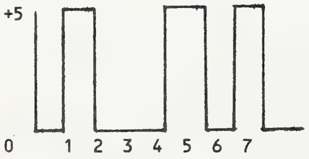
So far, I have spent a lot of time stressing the CP/M compatibility of these new machines. I will explain in the next issue why CP/M will become the standard microcomputer operating system of the 80's. The obvious question is: What ag-software is available? The first and foremost is the Homestead software. In a conversation with Homestead President, Sheldon Fulton, he indicated that they are willing to sell the software alone to anyone who has a CP/M system. The only constraining factor was the disk storage available on the users computers. Farmfax's General Manager, Ed Plohr, also indicated that future development would be conducted on CP/M in addition to the Radio Shack and Apple operating systems. They are also converting many of the existing programs to CP/M.

VOLUME II, NO. 9, NOVEMBER, 1981

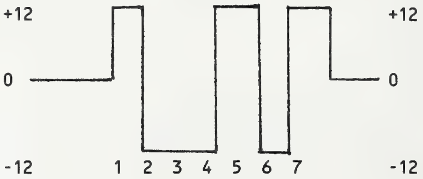
A detailed look at the RS-232 interface. Provides good reference material.

RS-232 AND OTHER WONDERS

If you wish to use your micro for data communication or just want to hook up to a serial printer, RS-232 is the electrical and logical standard that you will be using. To go back to our fundamentals, serial transmission is a way of sending out data on a single wire, one bit at a time. Let us say you want to send the letter E (upper case) over a wire to a printer or a modem (I'll talk about modems later on). The letter E has a binary code of 1000101 which is by the conventions of ASCII. If you were using a large IBM, the code would be different. If we were to represent 1 by a +5 volt pulse and a 0 by zero volts, E would look like this:



The vertical axis is voltage and the horizontal axis is time (let us say 1 second). If we sent out this character over a wire where each bit (1 or 0, +5 volts or 0 volts) takes one second to transmit, it would take 7 seconds to transmit the whole character. Surprise! Serial transmission is just like the old telegram system except the code is different. Let us now change our electrical standard so that a 1 is represented by a positive voltage (say +12 volts) and a 0 is represented by a negative voltage (say -12 volts). Our letter E now looks like:



How does the printer or modem tell when one character starts and ends? This is achieved by the use of start and stop bits. The character will have one start bit which is always 0 (-12 volts) appended to the front and one or two stop bits which are 1 (+12 volts) appended on the end. This gives the receiver the ability to differentiate between characters. Now that characters are separated, is there some way to check if anything has been garbled? This is done with a method known as parity. This method takes the data bits and adds them up and determines whether the result is odd or even. Once this is done, another bit is added onto the end of the character. If even parity is selected, a bit is chosen to make the sum an even number. If odd parity is selected, a bit is chosen to make the sum an odd number. If no (mark) parity is selected, no bit is added to the character. For example, our letter E has three 1 bits in it (1000101). If even parity is selected, a 1 is appended onto the character (10001011). There are now four bits an even number. However if two bits are changed and actually reversed (eg. 10 to 01), the parity cannot detect the error. This would only happen under very noisy conditions. We can see that the transmission is very precise yet forgiving to errors. The proviso is that both sender and receiver must work by the same rules.

Let's talk about speed of transmission of the character itself.

If we send a start bit, a seven bit character, a parity bit and two stop bits at a rate of one bit per second, it will take 11 seconds to transmit. This is fairly slow. The speed that most modems work at is 300 bits per second (BPS). Printers can work from 150 to 9600 BPS. One can translate bits per second (also known as BAUD) into characters per second by dividing by 10. Thus 300 BAUD is also approximately 30 characters per second. Again the sender and receiver must be working at the same speed or there will be problems.

Let us finally look at the electrical connections and how to make some sense of them. The connector is composed of 25 pins or sockets arranged in two rows; one 12 pins the other 13. The plug is in a D shape (one side shorter than the other) thus it can only be plugged in one way. There are two types of equipment which are defined by the standard, Data Terminal Equipment (DTE) and Data Communications Equipment (DCE). The DTE is something like a Terminal, Printer or the RS-232 port of most micros. The DCE is usually a modem. The basic pin arrangement is:

SIGNAL	PINS ON DTE	PINS ON DCE
ground	1,7	1,7
received data	3	2
transmitted data	2	3
request to send (must be a positive voltage or the DCE will not send)	4 output	4 output
clear to send (plus voltage sent by DCE, DTE needs this to send)	5 input	5 output
data set ready (DCE sends plus voltage, DTE needs this to send)	6 input	6 output
Date Terminal Ready (DTE sends plus voltage) when ready DCE reads Carrier	20 output	20 input
Detect (DCE sends when a phone connection is made)	8 input	8 output

One can wire the pins straight through (pin 2-pin 2, etc.) if there is a DTE on one end and a DCE on the other. However, if you want to connect two computers together e.g. a Radio Shack to an APPLE, you have the situation of two DTE's trying to talk on the wire at once. They both use the same frequency and their signals block each other. If we hook up pin 3 on a DTE to another DTE's pin 3, they are both waiting for received data which never comes. One has to cross the wires so that pin 2 goes with pin 3, pin 4 goes to pin 5 and pin 6 to pin 20. Also the computer may require that pin 8 (carrier detect) be positive. These can be wired to +5 or +12. I have given you a taste of the possibilities of hooking up serial printers, modems and computers to each other. If one understands the signals, you can connect equipment of different manufacturers with custom made cables you make yourself for a fraction of the cost. A good reference for interfacing equipment is Microprocessor Interfacing Techniques by Austin Lease and Rodney Zaks, SYBEX, Berkley, CA. **A NOTE OF CAUTION:** Make sure the equipment is RS-232 compatible! Old teletypes use a system called current loop which can actually do serious damage if hooked up to RS-232 equipment.

VOLUME II, NO. 11, JANUARY, 1982

Gives a good comparison of the two systems and helps to explain some of the changes taking place in farm accounting today.

CASH AND ACCRUAL ACCOUNTING

Many Compu-Farm readers already have a bookkeeping system for their farm and are currently looking at computerized systems or are starting from scratch to develop a system. To assist you in this search, it may be of help to retrace our steps and consider some definitions and examine the principles of bookkeeping so you can apply these to your search through computerized systems.

Methods Defined

Under the cash basis of accounting, revenues from the sale of goods are entered in the records in the time period when cash is received from the sale. The time period is the "accounting time period" fiscal year; this may be simply the calendar year. Expenses are usually reported in the books in the time period in which the payments are actually made for the purchase. Under the accrual basis of accounting, revenue from the sale of produce is entered in the books when some critical event occurs that is related to the flow of earnings, usually this event is the finalized sale or delivery of the produce and is not necessarily tied to the receiving of cash payment.

The rules for accounting are based on a few underlying principles. The basic tenet on which the accrual system rests is the "matching principle". Revenue is recorded in the year it is realized (production is sold) and an attempt is made to match the expenses with the revenue. The expenses then are the costs to the farm that can be tied to the production and sale for that year. Depreciation for each year is just a way to help match the costs of machinery and other long lived assets and the revenue for the year. Depreciation for each year is a measure of the amount of the asset that has been used up (converted to an expense for that time period) in the process of farm production for which we have recorded revenues. Expenses that cannot be tied to individual production items are treated as expenses for the year; an example in this case would be shop tools.

The modified cash basis of accounting is that used by the vast majority of farmers for tax reporting purposes. Revenues and expenses are recognized (recorded) when cash changes hands as under the cash system above. However, rather than treat the full purchase price of machinery, equipment, buildings and land as an immediate expense, these items are depreciated over the useful life of the machine, building, etc. as would be done under the accrual method.

Benefits & Criticisms

Farmers, lawyers, accountants and other professionals generally use the modified cash system for tax reporting purposes. You may not convert from the cash to the accrual method unless permission to change is obtained from Revenue Canada. However, you may elect to convert from the accrual to the cash method by filing a cash return.

The modified cash system is more convenient for tax filing. Accounts payable and receivable can be ignored as may inventory valuation. Income can be adjusted to year end through various tax management strategies. These include increasing expenses for the year by pre-purchasing farm inputs (chemicals, fertilizers, etc.) and at the same time postponing revenue by withholding sale of merchandise. The accrual system provides a more realistic and complete picture of the financial performance of the business. In measuring performance the cash basis of accounting suffers from two major criticisms.

First, the costs (expenses recorded) of the efforts required by you in production is not necessarily matched to these revenues. Performance between years gets confused. As a small illustration look at the cost of an annual rental fee. The sum paid in one particular month, say November, will be taken as an expense for that month. Under the accrual system a portion of that expense would be taken into each month's expense (into the following year) covered by the rental premium. The longer the time that items paid for now will benefit future years, the more serious is the criticism.

Second, the cash basis of accounting tends to postpone unnecessarily the time when revenue is recognized. In most cases the contracted sale of the goods is sufficient cause to recognize revenue instead of a cash receipt. This is less serious, although for analysis purposes it is desirable to know the production that actually took place on the farm for the current year and the expenses that accompanied (matched) this production. In this way the costs of production can be carefully analyzed in the light of the quality and quantity of product forthcoming.

Farmers generally find benefits from reporting taxable income on a modified cash basis and analyzing business performance by converting this cash statement to an accrual accounting form. How does this relate to the program you may choose? Most computerized accounting systems are of the double entry accrual form. These systems are, as discussed above, excellent for business analysis purposes but must be adapted by the user for income tax filing. Also many computerized systems contain subsystems for general ledger, accounts payable and accounts receivable, payroll, inventory control, and fixed asset records. Some contain management accounting packages, such as job cost systems.

It is necessary to choose the systems you require depending on circumstances. If you employ farm labour, a payroll package can be very helpful provided tax, U.I.C. and C.P.P. are updated regularly to the Canadian situation. Often not all packages available will be required on your farm.

Finally, many general ledger packages are based on the retail model and are most suitable to businesses such as corner stores that purchase and retail their merchandise. A general ledger system based on the manufacturing format may be closer to the actual production system of your farm. Producing financial statements which take account of the process of converting raw materials to finished products is more complex but may yield more information for analysis. Also specifics such as job cost systems for feedlots or swine enterprises might be considered along with other available management accounting systems.

VOLUME II, NO. 12 & VOLUME III, NO. 1

Although spreadsheets such as MultiPlan, SuperCalc and Lotus have incorporated functions to calculate these values, this article does provide quick reference material for those who want to do it themselves.

EQUATION CORNER

This is a new feature that will be aimed at farm management applications. Many times the programming is easier than finding the formula (or algorithm) that applies to the situation. This is particularly important to VISICALC users who just want to put together a quick model but have to dig to find the equation. Our first set of formulae deal with the value of money over time. (Simple you say? Try to find them all on one page!) First the variables:

P = the present value of a lump sum of money
S_n = the future value of a lump sum of money
i = the annual interest rate as a decimal e.g. 10% = .1
n = number of years to be analyzed
A = amount of annuity that is an annual payment

Now the formulae in mathematical and BASIC form. Present value of a future lump sum e.g. how much will $100,000 in 1992 dollars be worth today at a 10% inflation rate?

$$P = \frac{S_n}{(1 + i)^n}$$

Future value of a present lump sum e.g. how much will you have to earn in 1992 to equal the purchasing power of $20,000 today?

$$S_n = P\,(1 + i)^n$$

The next group of formulae deal with series of equal payments made at regular intervals of time. Where the payment is made at the end of a year, the annuity is called an ordinary annuity.

Present value of an annuity e.g. if one were to put $1000 in the bank for 10 years at 10%, what would be the equivalent lump sum that would have to be deposited this year to equal the stream of deposits?

$$P = \frac{A\,(1 - (1+i)^{-n})}{i}$$

Future amount of an annuity e.g. you wish to set up a fund for a college education for your children. If you deposit $1000 per year at 10% per year, what would the fund be worth in 10 years?

$$S_n = \frac{A((1 + i)^{-n})}{i}$$

Sinking fund e.g. you wish to have a fund of $50,000 in 10 years to make some kind of purchase. How much money would have to be deposited every year at 10% interest?

$$A = \frac{S_n \times i}{(1 + i)^n - 1}$$

Amortized value e.g. given a lump sum of $10,000 that could be deposited this year at 10%, what yearly amount would be required to be deposited to equal the future value of that lump sum after ten years?

$$A = \frac{P}{\frac{1 - (1 + i)^{-n}}{i}}$$

VOLUME III, NO. 3, MAY, 1982

EQUATION CORNER - LOAN AMORTIZATION

This month we will look at the formulae which allow you to calculate periodic payments on a loan. Because loans can have different payment periods and compounding periods, we in Canada must find the EFFECTIVE interest rate before we can calculate the periodic payment.

if e = effective interest rate
i = nominal interest rate (that stated on the contract)
k = number of payments per year
m = number of compoundings per year

$$e = k * \left(\left(\frac{1 + i}{m}\right)^{\frac{m}{k}} - 1\right)$$

or in BASIC form with e & i expressed as decimals

```
e = k * ((1 + i/m) (m/k)-1)
```

if P = principal to be repaid
N = term in years

then the periodic payment pa is:

$$pa = \frac{P*\frac{e}{k}*\left(1+\frac{e}{k}\right)^{Nk}}{\left(1+\frac{e}{k}\right)^{Nk}-1}$$

in BASIC form pa is :

```
pa = (P*e/k*(1 + e/k) (N*k))

       ((1 + e/k) (N*k)-1)
```

Remember: if you are translating these statements into VISICALC, that language evaluates expressions in strict left to right order ignoring any mathematical hierarchy. Thus (1 + e/k) must be written as (e/k + 1) to work properly.

VOLUME III, NO. 11, JANUARY, 1983

A light account of what can happen. The article provides some relevant questions for the consumer checklist.

THE SAGA OF CMS AND HOW YOU CAN PROTECT YOURSELF FROM A SOFTWARE FIASCO

When we purchased our Commodore Pet system almost three years ago, we wanted to obtain a representative general ledger system to show at demos. The system we purchased was a series of programs that included a general ledger, accounts receivable and payable from a company known as CMS software located in Texas. The programs worked admirably until Commodore went through one of its ROM changes on the PET and 2040 disk drive. We then found that the programs would not work because the language and the disk formats had been altered. When we contacted the Toronto distributer of the original program, we found that they no longer supported the program or our older (by two years!!) model machine. They suggested that we contact CMS directly and gave us a phone number which turned out to be for a different company. A search of Texas directories couldn't turn the company up and they had also stopped advertising in the magazines. We assume the company has folded and has taken the original source code with it. We are no slouches as programmers, but the programs are protected and cannot be cracked for modification without many hours of sweat.

Now please don't take this as an attack on either Commodore or any of the principals involved, as even the strongest of firms may disappear overnight. Although the hardware may last decades, the software is much shorter lived. Needs, hardware configurations and rules change, but the software does not. You have to depend on the software house for updates and advice. How can you protect yourself?

One of the easiest methods is to make sure that the software house has a SOFTWARE ESCROW AGREEMENT. This has the software house "bank" the source code (the original statements that made up the program) and documentation with a third party. As changes are made, the current version is made available to the escrow agent. In the event of the company falling into a black hole, the license holders (e.g. the people who purchased the rights to use the software) can go to the agent and obtain copies of all materials that have been banked. If the company (and the ownership of the software) has been sold, the escrow agent can help you get in touch with the new owners. If you are first time buyers or old hands at buying ag-software, ask the vendors if they have such an agreement. It can be a cheap form of insurance against the "CMS problem".

VOLUME III, NO. 12, FEBRUARY, 1983

Provides a quick list for anyone interested in switching over to Supercalc.

CONVERTING VISICALC TEMPLATES TO SUPERCALC

Although SUPERCALC is a worthy clone of VISICALC, templates created in the latter cannot easily be transferred to the former. You must type in the listing by hand. Here is a guide to interpretation and translation of these VISICALC templates. The first step to the conversion is to create a VISICALC listing of the template. This can usually be accomplished by the use of the storage command. The procedure differs with the specific version of VISICALC but on the TRS-80 version the command is /SS:P(cr). The VISICALC listing comes off in reverse order from the bottom right hand corner to the top left hand corner with the global commands following last.

The cell number is indicated after the greater than wedge > The start of the information is designated by a colon :

A **label** will be prefaced by a double quote sign ". Any formats or other slash commands are as they are typed.

```
> (cell location):(slash commands e.g. formats)
(labels "xxxx)
```

- For a label in cell A4 "COST" the listing shows >A4:"COST
- For a repeating label in cell A4 with ='s the listing is >A4:/-=
- If the cell has a format e.g. $ then the label will be >A4:/F$"COST

A **formula** is represented the same way as it is typed if we have +C33+C48 in cell C53 the listing will have: >C53:+C33+C48

In VISICALC, you will have to type a sign (+ or -) or decimal point or bracket to start off the formula, SUPERCALC does not need this.

A number in cell C53 such as 1200.45 will be: >C53:1200.45

The greatest difference between SUPERCALC and VISICALC is in the calculation order. VISICALC calculates in strict left to right order thus +C4+C5*C6 will add C4 to C5 and multiply by C6. SUPERCALC uses mathematical hierarchy where multiplication and division takes place before addition and subtraction. Thus +C4+C5*C6 will multiply C5 by C6 and add to C4. You will make greater use of parenthesis in SUPERCALC. E.g. +C4/100+1 C7 is (C4/100+1) C7

The final set of commands in the listing involve those which are global or window commands. Some of these are:

/W1	One window
/GOR	Order of calculation in rows
/GRA	Automatic re-calculation
/GF$	Global format of dollars and cents
/GC12	Global column width of 12 characters

There are some very strange commands which define where the windows are, where the titles are, and where the cursor will be located when the template loads. These commands are often prefaced by a /X command. If you are converting a VISICALC program with lots of /X commands in the listing, the best policy is to see an example and to input the appropriate commands for SUPERCALC. This applies to titles, windows and cursor resting places in particular.

SPECIAL FUNCTIONS translate with no problems except the @ sign is not required in front of the function and ranges are not designated by (...) but by a (:).

There are some differences in specific functions. We will cover all functions from both the old and newer versions of VISICALC (marked with *).

@ABS(value) = ABS(value)
>D47:@ABS(D20) is ABS(D20) in cell D47
* @AND(expression1,expression2) = AND(expression1,expression2)
@AVERAGE(list) = AVERAGE(list)
where a list is a combination of values (D20 or 123.23) expressions (D20-15) or ranges (D32...D35) separated by commas e.g. @AVERAGE(20,D21-1,D32...D35)
>D47:@AVERAGE(D32...D35) is AVERAGE(D32:D35) in cell D47
(only the non-blank entries will be averaged).
* @CHOOSE(value, list) where you choose the nth element in a list has no equivalents. Use LOOKUP with two rows or columns where the first row or column is numbered from 1 to n, one for each element while the second row/column contains the actual data.
@COUNT(list) = COUNT(list)
>D47:@COUNT(D32...D35) is COUNT (D32:D35)
(counts the number of non-blank entries in the list)
@ERROR = ERROR
@EXP(value) = EXP(value)

The logic functions only apply to recent versions of VISICALC and to all versions of SUPERCALC.

* @FALSE has no equivalent use a 0 in the SUPERCALC formula instead.
* @IF(expl,exp^2,exp3) = IF(expl, exp2,exp3)
(if exp1 is true then use exp2, if exp1 is false use exp3 instead)
>47:@IF(A1-1=0,A3*.015,A3*.20) is IF(A1-1=0,A3*.015,A3*.20)
@INT(value) = INT(value)
* @ISERROR(value) has no equivalent
@ISNA(value) = has no equivalent
@LN(value) = LN(value)
@LOOKUP(value, column/row range) = LOOKUP(value, column/row range)
(both languages require the ranges to be in ascending order.)
>C50:@LOOKUP(C49,B1...B13) is LOOKUP(C49,B1:B13) in cell C50
@MAX(list) = MAX(list)
>D47:@MAX(0,@SUM(D32...D53) is MAX(0,SUM(D32:D35)) in cell D47
@MIN(list) = MIN(list)
@NA = NA
* @NOT(expression) = NOT(expression)
@NPV(discount value, column/row range) = NPV(discount,column/row range)
(the value is expressed as a decimal e.g. 20% = .20)
>D47:@NPV(.2,D32...D35) is NPV(.2,D32:D35)
@PI = PI

The trigonometric functions are the same except for the lack of the @ sign on the function e.g.
@SIN(value) = SIN(value)
@SQRT(value) = SQRT(value)
@SUM(list) = SUM(list)
* @TRUE has no equivalent but you can use the value of 1 in a logical formula instead.

Although most of the functions will translate almost word for word, there will be serious problems with any application that uses the DIF format for communication numbers between templates.

TRS-80 MODEL 100 REVIEW

The first news I heard of the Radio Shack TRS-80 Model 100 portable computer was in the May issue of Popular Computing. I was amazed at the speed at which the machines arrived on the dealer's shelves. I obtained one from the local dealer in Olds for a review. In fact, this review is being typed on a Model 100. My first thought when I saw the machine was to compare it to other portable computers on the market.

Let's compare the Model 100 to machines like the Osborne and the Kaypro II. First, the sizes: The Osborne weighs 26 pounds while the Model 100 weighs 3.5. The Osborne is the size of a large portable sewing machine, the Model 100 is the size of a two inch thick notebook. The Kaypro has 64k RAM, and the Model 100 has up to 32k. Load in Microsoft BASIC on the Osborne and you get 29k free, the same as the Model 100 which has its BASIC in ROM. However, the biggest difference is the dependence of the Osborne and Kaypro on an electrical wall socket while the Model 100 uses AA and Ni-Cad batteries. This gives true portable operation. Compared to other portables, the Model 100 has a full size keyboard while the TRS-80, PC2 and the Panasonic HHC have "munchkin"-size keys. The LCD display on these machines and the T1 Compact Computer 40 (just introduced) have a one line display, while the Model 100 has eight lines of 40 characters. In fact, the display is the largest of any of the LCD displays on the market. If you want a bigger display, spend $12,000 on a Grid Compass.

The closest portable to the Model 100 is the Epson HX-20. The Epson can have a built-in 32 character printer and a mini-cassette drive. The display had to be shrunk to fit these extras. The Model 100 has several interfaces for external printers, cassettes, bar code readers, and modems. This gives a better choice of peripherals and maximum display size; I think a worthy trade.

When you turn the Model 100 on, you are presented with a menu which contains five items: BASIC, TEXT, TELECOM, SCHEDL and ADDRSS. There may also be files stored in memory from BASIC, the text editor or any of the other programs. This is because the memory of the Model 100 retains its contents even after the unit is turned off (there is a built-in Ni-Cad battery charged by conventional alkaline AA batteries). After you select TEXT by positioning your cursor over the word, you enter the text editor. It is a good full screen, character-oriented editor with word wrap (a full word is not cut when you reach the end of a screen line) which allows the user to insert, delete, move and copy text with simple keystrokes of the eight special function keys. It has one function which isn't on most expensive word processors. If you cut out some text, you can undo the change by pressing the "paste" key. This is also used to move or copy blocks of text. The text can be saved into memory or cassette when you are finished or printed with no formatting options. The Model 100 is designed to have the user enter the text "on the road" and then communicate it to a bigger word processor. The keyboard has a good feel to it which makes it a joy to use.

When you select BASIC, you enter one of the best versions of Microsoft BASIC I have ever seen. It equals the IBM PC BASIC in its richness and power. Graphics and device handling (modem, printer and cassette) commands are especially good. When you change program lines you have a full screen editor courtesy of the TEXT editor. This is a refreshing change from that horrible line editor that the Model 2 and 3's have! It's fun having a BASIC like this in such a small package; I wouldn't see any problems in transferring BASIC programs to the Model 100 (except for the difference in screen sizes).

The ADDRSS (address) and SCHEDL (schedule) programs are identical in their function. Files created by the text editor can be scanned for dates, names, addresses or anything else you want to find. It just searches for a string in the file, no complicated stuff. These utility programs are handy but I think they're window dressing, and hope they didn't take up much space in the ROM (they probably didn't).

The most exciting program is the TELECOM communications package. The Model 100 has a direct connect modem which can dial numbers from the address file and upload (transfer to) and download (transfer from) text or programs from any other computer. I dialed the University of Alberta and conducted a terminal session with no problems. The 40 character screen was not the best for viewing tables, but it was better than a 32 or 22 character display.

You can get the computer to automatically dial a person on your address list by using the FIND and CALL functions. This is the ultimate in automatic telecommunications with a personal computer. When you buy your modular phone jack cord, you get a free hour on the CompuServe and Dow Jones information services, a nice touch. The direct connect modem only works at 30 characters per second (300 baud). If you want higher speeds such as 120 CPS (1200 baud) you will have to connect a separate modem to the built-in RS-232 port. Also, if you do not have a modular phone jack available, there is an optional acoustic coupler attachment.

If I gave stars in my reviews, I would give the Model 100 five of them. But it is not a machine to replace a proper desk bound business system. You can spend $1100 for a self-contained Model 100 and not have to sink another nickel into it. There is absolutely no software available for the machine yet, so don't buy one if you don't intend on doing your own programming. This is a cassette based machine and thus it is unlikely to be suited for heavy record keeping purposes (I couldn't get the cassette interface to read data properly). If you have an application for a second computer (writing on the road), portable operation (data logging on site) or training (learning how to program), the Model 100 is the best of the bunch.

An indepth look at the 123 system and what it can do. Provides some interesting reading for both the novice and the experienced operator.

REVIEW OF 123 FOR THE IBM-PC

What do you say about a program that combines three expensive functions into one $700 package? What do you say about a program that requires 128k of RAM and two 320k disk drives just to operate? I would say it could only be second generation software running on a powerful 16 bit computer like the IBM-PC, which really justifies the purchase of such an expensive piece of equipment. When we bought our PC's, the only software available was re-hashed APPLE or CP/M software. Nice, but not too original. With the advent of packages like 123, you really have a reason to expand your PC to 256k and beyond. 123 was designed by Mitchell Kapor, the same person who wrote VISIPLOT-VISITREND and it shows. This program can be described as the combination of a spreadsheet, calc, graphics package and data file handler in one large program. And what a program it is, over 256k of code and help overlays. That's why you need 320k disks and a large memory.

When you purchase 123 you get a fat binder of over 350 pages, four floppy disks, a pocket guide and a slip-on function key template. An experienced user of spreadsheet programs wouldn't have many problems learning 123, but what about the novice? There are three ways to learn with 123. The first is to read the manual from cover to cover. The manual is clearly written (and typeset) but lacks the step-by-step tutorial format of the VISICALC manual. The manual contains a good index and glossary, something that other manuals should always include as a matter of course. (The manual should look good on your shelf next to all the other standard IBM documentation since it has a slip-covered binder format with similar sized pages). Another way to learn the program is to jump into it and use the very powerful help features. If at any time you need clarification on any command, just hit the F1 key and a menu of help screens will come up. Just steer the cursor to the area you want and you can get a very detailed description of the command and its usage. When you exit the help system by pressing the ESCape key, you return back to the same place in the program that you left off. The help file occupies 177k on the system disk. That's more than the total storage capacity of our old Commodore 4040 or TRS-80 Model III disks! The final way to learn 123 is to use the tutorial disk. This makes up for the lack of such a section in the manual. The disk tutorial looks just like a 123 screen with prompts on the lower half of the screen. You just read the directions and type in the requested commands. This tutorial is pure Computer Aided Instruction (CAI) and covers all aspects of the system from entering in numbers and formulae to graphing and data manipulation. If you can read or even just press buttons, you should have no problem learning 123.

When you fire up 123 what do you see? You see a menu with a cursor positioned over one of these 5 alternatives: 123 (the main program), File manager (housekeeping functions for the data disk such as copy, erase, rename, archive or sort), Disk manager (formats, copies and compares whole diskettes), Graph (change disks to get the graph printing program) and Translate (convert VISICALC templates and DIF files to 123 format). Let's look at the utilities first. The File and Disk manager are the standard housekeeping functions for maintenance of a data disk. They are of course fully menu driven and have help screens available. You could do these functions in the IBM-DOS environment but you don't have to. In other words, you never have to leave 123 to do anything. In VISICALC or any comparable spreadsheet program you must go into IBM-DOS to make disk backups and to check remaining space on a disk. The Translate program allows you to convert VISICALC format files to the 123 format. I have seen some calc programs that claim VISICALC compatibility but never seem to come through with COMPLETE translations. For instance the CALC-RESULT program that is so highly touted for the COMMODORE 64 will not translate the LOOKUP function in VISICALC. Since all of our tax templates use this function, CALC-RESULT models must be completely re-written. I believe that most, if not all, IBM-PC users have VISICALC. They are going to want to migrate their templates to any new package that they buy. Anyway, to make a long story short, the conversion was completely successful with no hitches at all. The Translate utility will also convert DIF files to 123 worksheet files and back again. There are other ways to transfer "foreign" data into 123 using the FILE IMPORT and EXPORT features, but I will cover these later.

When you select the 123 option, you jump into a dream spreadsheet program. Anyone who has used VISICALC (the older versions) and has said "I wish it could do this" has the answer to his prayers. When you press the '/' key you get a quite different menu from what you are used to seeing. This menu has Worksheet, Range, Copy, Move, File, Print, Graph, Data and Quit as the major headings. Worksheet allows you to set the traditional factors such as column widths, titles and windows. From this menu you can insert and delete columns or rows. You can also set number formats for the whole worksheet. These include fixed (you specify the decimal places), Currency (floating $ in front of the number), Date (three different ways), and percent (with a trailing % sign) as well as the regular formats available to older spreadsheets. The recalculation method can be set to either rows, columns or natural, i.e. recalculate as many times as needed to update all formulae.

The Range command allows you to set the format, erase, protect cells from tampering, or restrict the cursor to a specified block of cells in the matrix. Instead of always having to specify a block by its coordinates (A1 to H25 for instance), you can name a block and refer to it for copying, moving or even referring to in formulae. The Copy command allows you to take a range of formulae and copy them somewhere else. There is a major difference between the Copy command and Replicate of VISICALC. In VISICALC, you have a chance to give the constant variables in a formula by answering "No change" to the replicate command (this is important for things like interest rates that apply to several formulae). In 123 the constant variables must be specified in the original formula by imbedding a dollar sign in the constant. I.e. if B5 is the constant in +(1+A5)*B5 you must write +(1+A5)*$B$5 to specify B5 as a constant. Although this seems clumsy at first one gets used to it. The Move command is much more powerful that its counterpart in VISICALC. In the latter, you can only move whole rows or columns while in 123 you can move a block (explicitly designated as D6:J17 or a named range) from anywhere to any other location. This means you don't have to design the worksheet on paper to get the final design on the computer. 123 also automatically adjusts the formulae to take the block move into account.

The File command allows some pretty fantastic things to be done. You can of course save and load worksheet files from the disk but the whole directory of your data disk is available if you forget a name. You can also get the amount of space left on a data disk, so you can never be left without space. You can Import a Text file into 123 with one command, no DIF's required. If you wish to save only a part of a spreadsheet or combine several spreadsheets into one, there are commands for that. The Print command can have many formatting options like borders, margins, headers and footers. The range you give as the print region (which can also be named) is stored with the program so printer setup commands are only given once.

The Graph command is the most interesting command of all. After you have designed a great spreadsheet, you can jump into the graph command and request a bar, X-Y, line, stacked bar or pie chart. You give titles and other information to get a graph on the screen (ONLY IF YOU HAVE A COLOR GRAPHICS BOARD!) or to be saved for later printing. Like the print command, the settings for the graph command are stored with the worksheet. The naming feature is also available here. If you have a worksheet with several different tables with different types of graphs, the graph descriptions can be named and called in at will. Once a graph description is set, a touch on the F10 key will immediately re-draw the graph on a graphics screen. This is quite useful for what-if situations where you change one item and you want to see the results. When you print the graph using the GRAPH program, you have many more options to follow. This program supports a wide range of graphics printers including EPSON'S, IDS and others with plotters like the HP7470. However, 123 may not work with your printer, so check it out before you buy (that's why I like EPSON'S, they seem to work with everything!). The graph can be printed out with several fonts that range from Script to Roman to Italic. The size and rotation of the final graph can be specified so that you can even print a tiny graph on a 45 degree angle! If you have a plotter or color printer, up to six different colors can be specified. (More next month)!

EXAMPLES OF A HELP SCREEN

```
A1:                                                     HELP              Help Status Indicator

Worksheet, Range, Copy, Move, File, Print, Graph, Data, Quit,             Command Line
Global, Insert, Delete, Column-Width, Erase, Titles, Window, Status
-------------------------------------------------------101,275------------
"@Functions" An "@ function" is an instruction for 123 to calculate a -------
value.  You may use a function anywhere you'd type a number -- in a numeric
cell entry or at a command prompt.  When you press DY, 123 the function's value
and processes the entry as if you had typed the value itself.              Help Screen Text

All function names begin with the character "@".  With most functions, you must also enter one or more
"arguments", enclosed in parentheses.  Here are some examples of function usage:

           Alone:              @SUM(A12..D25)
   In ordinary arithmetic:     +C12*12.5/@COUNT(I10..I40)
   With other functions:       @MAX(5000,@AVG(B5..B12)

There are several types of functions:

Mathematical  Financial  Logical        Date
Special       StatisticalDatabase Statistical   Menu Items for Further Help
__________________________________________________

Arguments to functions        Help Index
```

The last command, Data, allows you to turn 123 into a simple file handler. A table of data can be set up where each row is like one card of information and each column is a category within that card. After telling the Data command the range of data that you are using, you can extract data according to a criteria (if column C is less than 25 and column E is equal to 50). A separate table can be created with the extracted records. You can also sort data by two different sort keys as ascending or descending order. The data rows can also be deleted according to a criterion (i.e. delete all rows where column E equals 50). Frequency distributions can also be calculated automatically on a table. All of this data manipulation must be done on the information in memory, so heavy data storage is best left to the database managers such as DBASE II. The maximum amount of data that can be manipulated with about 500k of main memory is 2048 rows and 256 columns. I would hate to see how slow such a huge model could be!

Now that the commands have run through, we can cover some of the other niceties of 123. One of the common "I wish" statements about VISICALC is the need to centre labels, not just left or right justify them. If you enter a label after hitting the caret (^), the label will centre. A label that is too long to fit into one cell will spill into any empty columns to the right. There are a whole series of keyboard macros which will create a self-prompting spreadsheet for use by untrained personnel. This allows you to write in 123 language just like in BASIC or DBASE II. We have only started to get into this feature, it is the most advanced in 123. Like VISICALC and SUPERCALC there is a wide range of built-in functions to SUM rows or calculate the Net Present Value of a data range. 123 adds some very advanced functions like:

@MOD(x,y) : calculates x mod y
@RAND : gives a random number between 0 and 1
@IRR(guess,range) : calculates internal rate of return based on a starting guess
@FV(prn,int,term) : calculate future value of (PRiNcipal) based on INTerest for a certain TERM
@PV(pmt,int,term) : calculates present value of (PayMenT) based on INTerest for a certain TERM
@PMT(prn,int,term) : calculates a loan payment from the principal,interest and term
@DATE(yr,mnth,day) : calculates the number of a certain date (great for ROP calculations!!!)
@DAY,@MONTH,@YEAR : calculates the day, month or year from a certain date number
@TODAY : gives today's date number (also great for ROP)
@STD(list) : calculates the standard deviation of a list
@VAR(list) : calculates the variance of a list

The statistical function can be applied to a database according to a criterion. This could answer the question "what is the average weight of animals born on a certain date" with a single function.

To conclude, I don't think there are enough superlatives to apply to 123, it must be seen to be believed. Although no program can be a panacea, I think that for planning and data manipulation purposes 123 may be the only program you will ever need, IF you are willing to learn how to use it. If you only want to push buttons in response to a canned program, then don't bother. For those unlucky enough to own other equipment besides IBM, don't fear, 123 is being converted to DEC Rainbows, TI-PC and a host of other advanced personal computers.

VOLUME IV, NO. 7, SEPTEMBER, 1983

The article serves as a reminder that there are things a consumer can do to protect his or her investment.

WHAT TO DO WHEN YOUR MACHINE GOES OFF THE MARKET!

September was a very bad month for OSBORNE users as the company filed for bankruptcy. Although not unexpected, the fall of what seemed to be a fairly solid company raises some interesting problems for owners of "off" brands (not from the big three) or those who have discontinued models.

When you hear that your brand or specific model is no more, you should ask yourself one question. Should you hold on to the computer or get rid of it? The answer should be determined by the current use of the machine and future plans for additions. If you already have all the software in place and the system has settled down to regular and constant functions then you might as well keep the machine. It will be like the old car that gets you from point A to point B. However if you are at the start of the development cycle of your system, consider the question further. If the machine is based on a standard operating system such as CP/M or MS DOS, getting software shouldn't be a problem for some years to come (if ever). If the hardware is based on the S-100 bus, you can still obtain replacement boards from many alternate sources. If the system had been made obsolete by a new model, is that new model upwardly compatible with the old? Upward compatibility means that the new machine can use the older machine's software or hardware. The same question can be asked for downward compatibility. If there is both downward and upward compatibility then keep the computer. If there is upward compatibility only you may have another two years before no new hardware or software is available for the older model. If there is limited (only on the BASIC language level for instance) or no upward compatibility then seriously consider dumping the machine **unless** you will be upgrading it to full capabilities within the next year. If you decide to dump it, then dump it fast. This is because the resale value of a discontinued model is greatly reduced. Get rid of it before potential buyers know it's obsolete! If you do decide to hang on to your old equipment then here are some tips to extend its practical life:

1. Get hold of all the technical manuals and documentation you can. Even if you can't make heads or tails of the information, a good serviceman can, and he may not necessarily be the original dealer either.
2. When you do get the technical specs, check to see how many of the chips are special custom and how many are "industry standard". You might consider pre-buying these custom chips to guard against short supplies in the future.
3. Join a users group that specializes in your brand of machine. There are a few members in each users group that know their machine inside and out, a great source of free info! You will also be able to get access to a wide range of software to keep the system going (users groups don't pirate software? HA HA!).
4. Get copies of all the specialized magazines specifically for your hardware and subscribe to at least one. Even if the articles are mediocre, the ads will be useful in tracking down new hardware.

5. Wait for the dealers to clear out their old hardware & software stock and expand your system using those bargains. Don't wait too long though, the best stuff goes fast.

6. Keep the faith! You may not have the most advanced system on the block, but at least you have stepped off the carrousel of technological change for a while!

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Provides some good information for anyone interested in working with a database or more specifically with DBase II.

DATABASE MANAGEMENT WITH DBASE II

One of the problems that the first-time user faces is the need to get his computer to store information and to get it out quickly with the minimum of trouble.

But there are three ways the user can get the computer to store data. The first is to write his own program which handles the specific kind of data to be stored. This has two problems, the time required to write the masterpiece and the specificity of the program. Let's say you spend one year writing a program to store information on your cropping system but when you're finished you would also like to keep records on the new beef operation you just started. Guess what - you have to completely rewrite the program. See you in another year! The second option is to buy a commercial program to handle the specific data. Now you don't have to spend a year writing it, but the problem of changing it to suit the new data is still there. You just have to pay $500 per day to get the program modified! This doesn't mean that a pre-programmed application is no good, it just may be too inflexible to accommodate differing data needs. Another problem arises when two very different programs try to use each other's data. This could happen when you buy fertilizer. The entry may have to be put in twice, once for the accounting package and once for the crop management program. This is not just confined to micros, the mainframes faced it as well. The answer for mainframes was the same as it is for micros, the Database Manager (DBM). DBM combines the best features of the flexibility of programming by the user and the ease of buying a pre-programmed package. One of the fundamental pieces of software any micro should have is the DBM.

However, all is not as it seems in this business. There are many programs which can store data that call themselves DBM's. The difference lies in how many files of data can be accessed at one time. Going back to our example, the files for the accounting and crops management programs must be accessed at the same time to get one fertilizer purchase recorded. Packages that can only work with one database (a collection of related data) at a time are called file handlers. These are useful for mailing lists or other simple applications, but not for complex tasks such a livestock management systems.

The ability to handle more than one database at a time is not the only thing you should look at when selecting a DBM. The ability to do numerical calculations on the data itself is important when calculating something simple like an average daily gain calculation. The database itself is divided into records and fields. A record is a collection of data on an individual, while a field is each piece of data that is collected or calculated and stored for that individual. If you are using a series of cards in a sow card file, each sow gets a card. This card is a record. Each card has several places to write down the information like date of birth, date of farrowing etc. Each one of these lines on the card (or record) is a field. The DBM may restrict you in the number of records, the number of fields or the total number of characters in a record. If you have a large number of fields or records, this may be a problem. The final characteristic of a DBM is how you interact with the program. Do you go through a series of menus to define, enter, edit, retrieve and report on the data or do you use a data manipulation language? The completely menu driven DBM may be easier to use initially but may also be less flexible than the language based DBM. Some newer DBM's like INFOSTAR combine some of the features of both.

The DBM that sells the most copies is DBASE II (PFS

File, which is not a true DBM, is the most popular file handler). DBASE II is one of the oldest CP/M based DBM'S on the market and sells for about $700. It is known as a relational database which means the data is arranged in a large table and relationships between the data are completely free form. It has some restrictions in the records, maximum 32 fields per record, 254 characters per field, 1000 characters per record, and 65535 records per database. It runs on any CP/M, CP/M-86 or MSDOS based system. It is a language based system, but the language is very English-like. Let's look at an example of using DBASE II to computerize a set of manual swine reproduction and health record cards. These cards have the following information: sow id., birth date, arrival date, description, vaccination info, breeding selection criteria, and tatoo number. There is also repeating information for date, event, no. of pigs born alive and dead, av. birth wt., no. weaned and the weight, sow weight at farrow and wean, and reasons. The card looks like this:

SWINE REPRODUCTIVE AND HEALTH RECORD

SOW ID ______________________________

BIRTH DATE ______________________________

ARRIVAL DATE ______________________________

DESCRIPTION ______________________________

VACCINATION ______________________________

BREEDING SELECTION CRITERIA ________________

TATTOO NUMBER ______________________________

BREEDING AND PRODUCTION RECORD

DATE	EVENT	NO. PIGS BORN		AV BIRTH WT	PIGS WEANED		SOW WT		REASONS FOR CULLING, DISEASE, PIGLET MORTALITY, ETC.
		ALIVE	DEAD		NO.	AV WT	FARROW	WEAN	

Now to transfer this into DBASE II. First you must decide if the card is to be treated as one database or two. The first 8 fields are only put down on the card once, but the data from date to reasons are repeated for each breeding event. If you had to repeat the first 8 fields for each breeding event, you would have a great amount of duplication, but the whole idea of a DBM is to keep duplication of data down to a minimum. Therefore you set up a database with the basic information on each sow (birth date, etc.) and a database for the breeding and production records. The link between the two databases will be the sow's ID number. When you set up the database, each field must be described as to its type (alphanumeric or just numbers) and its length in characters. To start up the database you type CREATE (the database name). If you type CREATE SOWS, you will go into a routine that asks the name, type and length of the record as follows:

```
   .CREATE SOWS

ENTER RECORD STRUCTURE AS FOLLOWS:
   FIELD NAME,TYPE,WIDTH,DECIMAL PLACES
   001        SOWID,C,9,0                 ... the name (less than 10 chars), type (Character), nine
                                              characters
```

The rest of the fields are entered in this manner. When we display the structure we get:

```
STRUCTURE FOR FILE:           A:SOWS. .DBF    ... the name of the database in drive A
NUMBER OF RECORDS:            00000           ... the current number of records in the database
DATE OF LAST UPDATE: 17/10/83
PRIMARY USE DATABASE                          ... the first database selected
FLD NAME          TYPE  WIDTH DEC
001 SOWID          C     009
002 BIRTHDATE      C     008
003 ARRIVDATE      C     008
004 DESCRIPT       C     030
005 VACCINTN       C     030
006 CRITERIA       C     030
007 TATTOO         C     010
** TOTAL **            00126          ... total number of characters in the database
```

For the breeding database we have this structure:

```
STRUCTURE FOR FILE:           A:BREEDING.DBF
NUMBER OF RECORDS:            00000
DATE OF LAST UPDATE:  17/10/83
PRIMARY USE DATABASE
FLD NAME             TYPE  WIDTH DEC
001 SOWID             C     009
002 DATE              C     008
003 EVENT             C     002
004 NUMBORN           N     002
005 NUMDEAD           N     002
006 AVBIRTHWT         N     003   001   ... This field has 1 character to the right of the
007  NOWEANED         N     002             decimal point
008 WEANEDWT          N     003   001
009 SOWWTFAR          N     004
010 SOWWTWEN          N     004
011 REASONS           C     060
** TOTAL **               00100
```

Now that we have designed the two databases, we can enter in data with this series of commands:

```
.USE SOW                             ... this command attaches the SOW database to the system from the disk
  drive
.APPEND                              ... this is the command to add more records to the database
```

When you execute these commands you get a full screen data entry menu which allows the data to be entered in any order. If you wish to change any existing records, you must know the record number (an internal number assigned by DBASE II to each record in sequence of their entry) is and type:

```
.EDIT 123                            ... this brings up the same data entry screen as seen in APPEND
```

When you exit the edit subsystem, the record is automatically updated.

After you have entered and edited the data, the next step is to retrieve information from the system. Let's say you want to see the card for sow #123D36. Type in:

```
.USE SOW                             ... This brings in the database, only executed once per session
.DISPLAY FOR SOWID='123D36'          ... DISPLAY shows the record FOR the condition of SOWID=something
```

The retrieval can be made much more complicated by the use of the logical operators AND, OR, and NOT as well as looking for inequalities. For instance:

```
.DISPLAY FOR BIRTHDATE>'83/01/01' .AND.
   BIRTHDATE<'83/12/31               ... gives the sows born in 1983
```

Let's try an even more complicated retrieval using both databases at once. To find the sow id's , breeding criteria and birth dates of sows that had greater than or equal to 5 piglets born dead, use these commands:

```
.USE SOW                             ... bring SOW into the first database area
.SELECT SECONDARY                    ... open up the second database area
.USE BREEDING                        ... bring the BREEDING database into this area
.SELECT PRIMARY                      ... go back to the first database are where SOW is
.DISPLAY SOWID,BIRTHDATE,CRITERIA
    FOR SOWID=S.SOWID .AND. S.NUMDEAD>=5  ... the fields to be displayed are before FOR, S. selects a field
  from the secondary database
```

You see that with two databases you can do some very complicated data retrievals, but the best is yet to come. Instead of typing in the five commands every time you want to check the databases, you can store them in a COMMAND file. Then when you want the info just type:

```
.DO FINDDEAD                         ... Where FINDDEAD is the name of the command file
```

Reports can also be designed to any taste with another set of powerful formatting commands. If you want to calculate things like indexes and ADG's, there are temporary variables which can store the contents of one field from one record and then be added, subtracted, divided or multiplied. The results of the calculated variables can be re-stored into a field on any database. These last two properties give DBASE II the ability to handle almost any application that requires data storage and manipulation. Ashton Tate, the software house that developed DBASE II maintains a list of all the third party software houses that have used DBASE II to create application packages. These applications range from a fencing price calculator to accounting to dairy farm management. Because of these pre-programmed applications plus the books, magazines and courses that cover DBASE II, I have no hesitation in recommending this system to anyone who needs data storage on a micro. There may be packages that are technically better but there are none with better support.

Contact: Ashton Tate; 10150 West Jefferson Blvd.; Culver City, CA 90230; (213) 204-5570, or your dealer.

If you want to know more about DBASE II read EVERYMAN'S DATABASE PRIMER by Robert A. Byers.

VOLUME IV, NO. 9, NOVEMBER, 1983

COMPUTERS FOR CHRISTMAS REVISITED

Here it is, Christmas '83 and the buying decisions haven't gotten any easier. The big news of the season is the loss of the TI-99/4a which is no longer being built, but is selling at fire sale prices, a good buy! Both the Coleco ADAM and the IBM PCjr will not arrive in time for Christmas and have been dropped from the comparison charts. I have included a wide range of prices and capabilities but my price limit is fixed at $1300 for a stripped down unit. Remember, if the machine is way under $1000 the expandability and practical software availability may suffer. Also, the ratings are of a subjective nature and are the result of my extensive reading of magazine ads, and as such are limited by my choice of reading material. Essentials such as a cassette to store data or a display will usually cost extra. The availability of software and programming considerations are rated from 0-10.

Computer	Common Price	RAM STD	RAM MAX	Avail. Cart.	Cass. Games Avail.	Educat. Avail.	Practical Software Available	Ease of Learn	Adv. Prog.	Text Char.
ATARI 600XL	$225	16	64	6	10	6	5	4	8	40x24
ATARI 800XL	$420	64	64	6	10	6	5	4	8	40x24
COMMODORE Vic20	$199	5	32	5	8	5	3	8	5	22x23
COMMODORE 64	$399	64	64	5	8	8	5	8	8	40x25
APPLE CLONES	$600?	48	64	0	DISK	9	10	4	8	40x24
TRS-80 C.C.	$359	16	32	4	8	5	3	9	7	32x16
TRS-80 MC-10	$140	4	20	1	1	1	0	2	3	32x16
TI 99/4a	$85-90	16	52	4	7	8	5	8	8	32x24
TIMEX TS-1000	$70	2	64	0	7	3	1	3	3	32x24

Computer	Graphics	Color	Sound	Keyboard	Video	Cass.	Joysticks	Remarks
ATARI 600XL	320X192	256	2	3	1	2	2(8)	Most popular games.
ATARI 800XL	320X192	256	2	3	1	1	2(8)	A 600XL with more memory.
COMMODORE Vic20	176X184	16	2	3	2	2	1(8)	Price includes cass.
COMMODORE 64	320X200	16	2	3	2	2	2(8)	Most popular under $1000.
APPLE CLONES	280X192	16	1	2	2	1	2(*)	Apple II clone, runs all Apple S/W.
TRS-80 C.C.	192X256	8	1	2	1	1	2(*)	BASIC is best of low cost models.
TRS-80 MC-10	192X256	8	1	2*	1	1	0	Low price. Low capability.
TI 99/4a	256X192	16	2	2	2	1	2(8)	Best buy, supplies will be limited.
TIMEX TS-1000	64X48	0	0	1*	1	1	0	A disposable.

Computer: The machines selected are those available in the Alberta market as of December. Apple Clones are available from various dealers in Calgary and Edmonton, watch the computer classifieds in the papers.

Price: This is the currently advertised price in Alberta. Some of these prices are holiday specials.

RAM: The amount of Random Access Memory available, measured in thousands of characters. The larger the RAM space, the more complex the software that can be used.

Cartridge: A plug in cartridge offers the greatest convenience. These are mostly for arcade style games.

Cassette games: They are the most plentiful source of games, but many games are only available on disk.

Educational: These are programs or cartridges that teach something or can be used in an educational environment. Many of these programs will require a disk drive.

Practical: A practical program would fall under the categories such as accounting, word processing, spread sheet analysis and decision models. Usually a disk and extra memory is required to obtain these.

Ease of Beginners Programming: This is a measure of how easy a first time programmer can use features such as graphics, sound and color. The more these features are implemented with BASIC statements, the better.

Advanced Programming: These advanced features include color shading, shape definition, animation, advanced sound and others. This is a measure of "how far" you can take the system.

Text Characters: The number of characters displayed on a screen, expressed by characters/line x number of lines.

Graphics: This is the maximum number of points that can be displayed on the screen. The first number is the number of horizontal points while the second is the vertical points. More points give a lifelike picture.

Color: This is the number of colors that can be displayed on the machine at one time.

Sound: Sound plays an important role in games and other applications. The sound can be of two qualities, single voice (one note at a time) or polyphonic (chords and different sounds).

0 = no internal sound, attachments may be available
1 = single voice
2 = polyphonic

Keyboard: The style of keyboard affects its utility. Closely spaced keys, non standard size keys on keyboards make typing harder. The greater the number of keys, the easier the keyboard is to use.
1 = membrane keyboard
2 = typewriter
3 = typewriter plus special function keys
* = non standard key size or spacing

Video: Some computers will work with T.V.'s alone while others can use special monitors and T.V.'s. Serious programming will require a high quality T.V. or a monitor to avoid eyestrain.
1 = VHF (ch 3 or 4)
2 = external monitor or T.V. connection

Cassette: Some computers require a special cassette unit that will add the the cost of the system.

1 = any cassette
2 = special cassette

Joysticks: If joysticks are available, there are questions of the kind and number that can be attached. The number of joysticks and the number of directions they point to is given as:
For example: 0 = no joysticks or 1(8) = one joystick with eight directions of 2(*) = two joysticks with resistive contacts giving infinite number of directions.

Even though these models have since been replaced with better units and the prices are out of date, it is interesting to see and compare just how much things have changed.

WHAT TO LOOK FOR IN A PORTABLE COMPUTER

Portable computers are going to be the biggest growth area in the whole microcomputer industry. The definition of a portable computer vs a transportable computer is the former operates without an AC power cord. The OSBORNE or KAYPRO computers are transportables while the TRS-80 Model 100 is a true portable. Just one year ago, portable computers were basically programmable calculators with one line displays like the Sharp PC1500 and the HP41-cv. Although programmable in BASIC there was little software outside of engineering. There were no portable word processors, spreadsheets and telecommunications programs. The limited memory capacity of these earlier machines relegated them to be the "second computer" for doing things on the road. I think that the advances in portable computers are coming to the point where a portable can be the only computer you may need. I have been recently going through a selection process to buy my own portable and would like to share some of the features I looked for (a broken down truck prevents me from taking the plunge!).

Size: You want to fit a portable computer in a briefcase or under your arm, so keep it small and light. How's about 8.5"x11" and no more than 2" thick, weighing no more than 5 pounds?

Keyboard: Real typewriter sized and spaced keys. It's too much to ask for a separate numeric keypad but some of the keys on the main keyboard could do double duty as calculator keys. However, four separate cursor keys are a must. The keyboard should not make too much noise, no 'clicks' allowed, you don't want to draw too much attention to yourself in a quiet room.

Display: It should be built in and be 80 characters wide. 24 lines would be nice to have, but nobody has this for less than $10,000, so look for as many lines as you can. The wide display is best for word processing and spreadsheets. Can the display be viewed from a wide range of angles? Many LCD displays have problems with viewing by more than one person (someone looking over your shoulder).

Memory: Get as much memory as you can, at least 64k expandable to 256k. Many machines use the main memory to store all the programs and data, which makes the useful active storage area smaller. If the computer has a built in storage unit, the memory is not as critical.

Permanent Storage: I think the best form of permanent storage on a portable is bubble memory. This method uses chips that will store about 128k in a small space using no power and retrieving data with lightning speed. However, at this time bubble memory is expensive, leaving the micro (under 5") disk drive as the best alternative. This will give a higher capacity of up to 256k, but at the cost of extremely high power consumption. The least desirable storage alternative is the cassette. This format has always proved itself slower and much less reliable than disks or bubble memory.

Power: Definitely rechargeable batteries with the option of an AC adaptor/charger. It would be desirable to have the batteries as standard AA, C or D size so replacements are easy to obtain from sources other than the original manufacturer.

Interfaces: There should be a parallel printer interface, a serial interface for such things as external modems, a processor bus interface for future expansion and a bar code reader port. The bar code reader could be used to enter pre-programmed software on bar codes or to read the UPC codes for inventory applications. If you are going to use the computer to tele-communicate, then a built-in direct connect modem port is desirable. It would be nice if it operated up to 1200 bits per second but 300 is more common. Other modems use the telephone handset, they are called acoustic coupler modems. These allow you to use a phone booth but are less reliable than direct connect.

Software: Built-in software should include BASIC (compatible with Microsoft Basic on other computers), a word processor, a tele-communications program, a spreadsheet and a data filer. Your own applications will determine which is most important since few machines contain all the above software. My personal preference is for word processing with telecommunications as a close second.

The three most common portables in Canada are the TRS-80 Model 100, NEC 8201 and the Sharp PC5000. The first two machines are cut from the same cloth but have some major differences. The Sharp is a considerably higher priced unit but has more advanced features. Here is a quick and dirty comparison chart:

FEATURE	**COMPUTER**		
	TRS-80 Model 100	Nec 8201	SHARP PC 5000
Size in inches (DxWxH)	11.9x8.5x2	11.9x8.5x2.5	12.8x12.3.4
Weight (pounds)	3.9	3.8	11
Keyboard (totals & cursors) cursor keys	72 keys, small inline	67 keys, diamond pattern inline	72 keys, total,
Numeric key pad	10 keys double as num pad	no numeric pad	no numeric pad
Display	40x8 LCD over keyboard	40x8 LCD over keyboard	80x8 flip up
Graphics	240x64 points (pixels)	240x64 points	640x80 points
External monitor option	no	yes (claimed, no details)	no
RAM memory size (std-max)	8k - 32k	16k - 96k	128k - 256k
Permanent storage	Ram memory & cassette	RAM, cass., op. disk expans., size N/A	RAM, bubble(128k) op. 5.25" disk 320k
Power	4 alkaline AA size	4 alkaline AA size	rechargeable pack
Interfaces (where parallel is a centronics printer port)	parallel, serial, bar code cassette, internal bus conn.	parallel, serial, bar code cassette, CRT, disk, RAM memory cartridge	serial, cassette, disk, int. printer bubble memory cart.
Modem (speed in bits/sec)	direct connect std (300 bps) opt. acoustic coupler (300 bps)	optional external acoustic coupler (300 bps)	optional external direct conn. 300bps
Built in software	BASIC, text editor, address book, scheduler, telecommunications	BASIC, text editor, telecommunications	MSDOS compat. with IBM, BASIC, word processor, telecomm.
Price	$1099 w/8k, $1599 w/32k	$1200 w/16k	$195 per extra 64k

To sum up the above information, the Model 100 is good for inexpensive on-the-road writing. The Sharp is best for heavy duty computing. If you have any doubts, wait. You ain't seen nothing yet!

FEARLESS PREDICTIONS FOR '84

After months of digesting news, magazine and trade journal articles, not to mention digesting some Christmas cheer, I am now ready to stick my neck out and give some fearless predictions on the ag-computer hardware and software scene.

THE BIG THREE: This will be the year of IBM if all the industry observers are correct. The PCjr is going to hit Apple and Tandy where they live, the $2000-$3000 hardware. I remember the complaints about technical mediocracy that greeted the original PC. Look where it is now! This same success could be repeated with the PCjr if it is perceived to be successful by the software houses and retailers. The early indication is that they are positive. On the higher end of the scale IBM is running circles around its competitors by offering compatibility to IBM mainframes on the PC-370/XT (a card set which turns a PC-XT into a small IBM 370 mainframe) and the 3270 PC (a micro which is 4 regular IBM terminals plus a stand-alone PC, IBM's answer to the LISA). Look for a newer re-designed PC (with a 68000 chip maybe) and a portable to round out the product line for '84.

Apple will introduce their Macintosh in January for their board of directors meeting. I think that this will be their last chance to recapture their once dominant position. The Macintosh is supposed to be a scaled down LISA but without all of LISA'S faults (slow and clumsy). Definitely watch for this one! I think this will be the last year for the lame duck APPLE III, finally dispatched by lack of software and an Edsel like reputation. The APPLE IIe has to go down in price this year, compared to its competitors and clones it's grossly overpriced. Apple can either cut the price on the IIe or, like IBM, introduce a cutdown version. Look for boards that turn a IIe into an IBM-PC, Macintosh, LISA, CRAY1 and anything else that they can think of to keep their old moneymaker around. The LISA is being killed by IBM at the targeted Fortune 500 company level, Apple just doesn't have the salesmen to compete with IBM's. Look for a card which turns a LISA into a (what else!) IBM-PC. Apple is frantically trying to get software for the LISA and to lower the price to make it attractive. However they have a lot of R&D costs to recover!

Tandy is also jumping on the IBM-PC bandwagon with the Tandy 2000. Although this machine has many improvements over the PC such as true 16 bit operation, faster speed (twice), and higher capacity disks, very little of the massive amount of software for the PC will run on the 2000. This means that Tandy must convince every software house that their machine will be successful. Since it is third party support that makes micros successful, Tandy must resolve the software and hardware incompatibility problem first. Because of pressure from the PCjr, expect the price on the Model IV to drop. There are rumors that Tandy will introduce a more powerful addition to their popular line of portable computers. The new Model IV transportable is going to get blown out of the water by KAYPRO - $2700 with no software. Come on Tandy, get real! I also think the Color Computer may suffer a similar fate at the hands of the Commodore 64.

The El-Cheapo computers: It's going to be Commodore all the way in '84. They are the only company making money out of the under $1000 computers (despite quality control problems). There are rumors that a Commodore 128 will be introduced this year, as a new ante in the more-memory-for-the-dollar-race. I just hope that Commodore breaks an old tradition and makes the new model compatible with the 64. Also look for an entry into the business market to replace the aged 8032.

Atari is going to have to make some money sometime on their home computers. Just how desperate they are was evidenced by a price increase just before Christmas. If the new XL series doesn't make it profit-wise, we might see another TI 99/4 on the way. Nothing to get too worked up about, there are enough games out there to keep one playing for several lifetimes.
Timex has introduced the 2068 which has color, a low price, and a keyboard that has been described as having a feel "like typing on dead flesh". Software may be a problem at first. Timex will still be a good bet for a truly disposable computer.

The biggest sleeper or potential dog this year may be the COLECO ADAM. When it is finally delivered at a price of just over $1200, it may be the best value of '84 if it works. The printer is one of the slowest and noisiest on the market today, and the ADAM still uses tape cassettes (Coleco calls them digital data packs, new heights in newspeak!). I urge caution for anyone buying one, see if the rumored quality control problems are resolved first.

THE CLONES AND COMPATIBLES: As Apple's share of the market shrinks, the company's legal battle with the clones may become even more vicious, as Apple tries to protect its share. However, with so many clone makers jumping onto the IBM bandwagon, there may be nobody left to litigate. I pity any company who has to come up against IBM on copyright infringement cases. The only reason that IBM clones exist is that IBM cannot meet present demand, thus keeping PC prices above the clones. This could change rapidly as new production facilities come on stream. I do think there will be a good niche for the near compatibles from such larger companies as Texas Instruments (to be reviewed in the next issue of Compu-Farm) and Digital Corporation. They have the corporate resources to follow a parallel course to IBM. But buying from a smaller company involves asking the question, how compatible is it with the 'Big Guy'. Even if the company then goes belly-up you can keep on running with IBM software and hardware.

THE JAPANESE: I think this will be the year that the Japanese make their big push. They now have a standard (IBM) to follow and their slowly growing dealer networks may have finally reached critical mass. Every Japanese machine I have seen in the last year has offered good graphics, color and keyboards. Some like the EPSON QX-10 have offered good price/performance ratios as well. I think the potential winners this year may be NEC (the largest micro manufacturer in Japan), SHARP (for their innovative portable unit) and EPSON (the QX-10 is a good buy). Compatibility with either CP/M or MS-DOS will be the deciding factor in making the Japanese machines successful. In the low cost equipment the Japanese have worked with Microsoft to develop the MSX standard. However, given Commodore's grip on the low end market, a standard in name only does not guarantee market acceptance.

PORTABLES & TRANSPORTABLES: Now that OSBORNE is out of the way, KAYPRO will be the dominant force in the trasportable section of the market. They have introduced an add-on board which will give their equipment MS-DOS capability (with some compatibility to IBM). The SHARP PC-5000 may become the most popular high performance portable because it has the most features for the money, but in the lower cost class, the TRS-80 Model 100 will continue to be a strong seller.

OPERATING SYSTEMS: MS-DOS and PC-DOS (the IBM version of MS-DOS) will continue to dominate the PC end of the market, leaving CP/M-86 in the dust. Although concurrent, CP/M-86 has a head start in the multi-tasking operating systems (where your computer can do four things at one time, e.g. manage the feeding system and the accounting system at the same time), MS-DOS 3.0 will still blow it off the market. If Microsoft has any sense at all, they will make the large installed base of MS-DOS programs compatible with this new concurrent operating system. UNIX, PICK and other multi-user operating systems will have little impact on the Joe Average computer because of the great amount of machine resources required (8 megabytes just for the operating system alone!!). APPLE has now put itself into the same league as COMMODORE by offering operating systems that work exclusively on their equipment. These are the new LISA/MACINTOSH operating systems and PRO-DOS (APPLE's last kick at the clone makers, it doesn't run on a clone that has changed the ROM's from the original APPLE II+). Speaking of tying down your customers, look for IBM to introduce its own operating system on the new PC. I don't think a company the size of IBM is really too interested in maintaining links with a small fry like Microsoft, they must have thousands of qualified staff to do the job. The use of MS-DOS has opened IBM up to competition by all the other "me-too" companies, a proprietary operating system would make it harder to duplicate the system.

WINDOWING SYSTEMS: Windows are a way of dividing a computer screen into several areas that carry out different functions where data can be passed between these functions. Usually these systems use a mouse which points to objects on the screen which can be selected as menu items. For instance you could have a spreadsheet in one window and a word processor in another window. With the mouse you select part of the template in the spreadsheet and point to the part of the word processor window where you want it to go. Although I think this is a pretty stupid method of using a computer (Da, I want dat one!), unfortunately it is going to be fabulously popular. Microsoft WINDOWS will be the best seller on the IBM style machines with LISA setting the standard for non-IBM computers.

Integrated software: If I see another ad for a spreadsheet/word processor/database manager, I think I will heave all over my keyboard! Now, I get all these ads wrapped up into one product - the integrated application. I hope this will cut down on the number of ads in my favorite mag! Unfortunately there will be more ads for integrated software! This will be the year for integrated software that combines the three functions mentioned above plus graphics, communications, and a calendar. To stay on top of that race, LOTUS (of 123 fame) has just announced a new integrated application called Symphony.

Ag-software: I predict that everybody that had a grandfather that lived on a farm and has over grade six education will be writing ag-software this year. I also predict that they will all starve! I pity anyone that has to buy software under these conditions. Please John Deere, won't you please just bless somebody's software and get us out of this mess! On a more serious note, the hot prospects in ag-software this year will be attached to some sort of process control or automatic data logging equipment. The weak part of any computer is the person behind the keyboard (even with a mouse!). Anything that cuts down data entry will make things go easier.

THE TEXAS INSTRUMENTS PROFESSIONAL COMPUTER

I know what you're thinking. TI got out of the computer business, right? Wrong, TI is out of the home computer market but is still strong in personal computers. The TI/PC is a machine that deserves serious consideration by anyone who is looking for a machine in the IBM/PC range of capabilities. Altel Data lent us a unit for two weeks to give us a good look. Let's examine the parts and compare it to the IBM PC.

Hardware: The TI is almost the same size as the IBM. The front of the main box is plastic with snazzy curves. The overhang of the molding did not seem to let the drives open all the way giving us some difficulty in disk insertion. The rest of the box is very plain with square corners. The rocker style power switch is not recessed like the IBM. The fan on our model was quite noisy. I hope they aren't all like that. Our model had a 5 megabyte hard disk that operated very well, although it did not have the new MSDOS 2.x series which makes easier use of the hard disk (it is available). The most impressive feature of the machine is the keyboard which contains 97 keys - organized better than the IBM. There are 12 special function keys across the top, dangerous editing keys are separate from the main keys, and the cursor keys are in a diamond pattern with HOME in the middle. The numeric pad has +, -, space, tab, comma, and enter keys. The caps-lock key has a little light in it. The main body of the keyboard is laid out like a Selectric with wide keys for the ham-fisted. The whole keyboard has infinitely variable tilt. I saw three minor problems with the keyboard. The keys tended to bind when not struck vertically, the keystroke is quite shallow i.e. fires in the first quarter of travel, and there is no pencil shelf. In spite of this, it is one of the best keyboards available. The other exemplary feature is the color display system. The resolution (720x300 points), the color (8 colors at hi-resolution) and the character clarity are all vastly better than the IBM. If you buy a TI spend the extra bucks to get the color, it's worth it. The guts of the TI are the final distinguishing feature, there are 5 free slots because the disk controller and parallel printer card are on the main circuit board. The mother board can be expanded to 256k by just plugging in chips, expansion past 256k needs a separate board.

Documentation: The books that come with the TI are of equal quality to IBM's guide. The installation and getting-started instructions are excellent with lots of pictures. The MS-DOS manual is better written that IBM's in some areas. There is less technical information on the inner workings of DOS, neither here nor there for beginners. The Basic manual is only half as thick as the IBM's with less information on getting started (no pictures of the keyboard for the editing functions). Statements are grouped by function rather than strict alphabetic, this makes the manual less useful for reference. The IBM manual has more appendices but not a quick reference book. Having no tutorial sections, neither manual is for beginners, but the IBM manual has the edge as a complete reference guide. The only other piece of software we had was 123 which has the same manual for both machines.

Software: LOTUS 123 is the one program you should see if you want to get sold on the TI. It operates the same as the IBM version with some important differences. The full graphics of the TI are used in Hi-res. Graphs come out twice as detailed. 123 has six graph ranges, the IBM can only show three colors before repeating, but the TI can show six different colors at once (leaving two in reserve). Although when we tried to print the graph on an EPSON, the graphs came out with the same graphics resolution as the IBM. I'm sure the EPSON can duplicate the 720x300 pixel range of the TI, so what goes here? The TI had no problem reading our IBM formatted 123 files (they have the some disk format), but the TI's version of BASIC was not as compatible. When we loaded in our standard BASIC programs there were some problems with locating the cursor at the appropriate locations. The cursor would appear one line below the intended line until a key was struck, then it returned to its proper position. The graphics commands are not as powerful as those on IBM's BASIC 2.0 and event trapping (where the program executes a subroutine when a special function key is pressed or the lightpen is touched to the screen etc.) is not supported. This does not seem to be the GWBASIC that can be obtained from Microsoft, but a BASIC 5.0 with some graphics extensions.

Compatibility: Luckily the TI is not sold as an IBM compatible since only one out of 30 IBM programs we tested ran on the TI (it was DBASE II). However, since they use the same disk format, data files can be exchanged. In ag-software, Countryside Data using CP/M-86 was the only program which could run unmodified. Although any program which uses DBASE II, 123 or some other higher level language would run without problems. If a program uses compiled BASIC or special IBM graphics commands in the interpreter, conversion will be required.

Prices: A TI with color monitor, two disk drives, three plane graphics (to give 8 colors at hi-res) and 256k would cost $5160. An equivalent IBM would cost about $1000 more.

Conclusions: With eleven service centers across Alberta, Altel Data offers the best service of any computer vendor. This plus the obvious virtues of the TI make a good combination for Alberta farmers to look at. Don't think of this machine as an IBM compatible because it isn't. It stands on its own merits and must be considered as such. The only rub is in the area of software availability. The TI has all the super-star software but does not have the wide range and depth of the IBM's software offerings (through third parties). However, TI seems to be making a real effort to get ag-software on their model. I got a very nice kit for software developers from TI the other day. It had all sorts of deals and discounts for those who were willing to convert their ag-software. Those looking at big blue's machine had better make sure they look at the TI before they sign the cheque, it might be worth their while.

VOLUME V, NO.1, MARCH, 1984

Provides a good example of what can be done with limited resources and is interesting from a historical point of view. (A 4k system!!!).

THE SIMPLEST ACCOUNTING PROGRAM OF ALL TIME!!!

For those who bought a Vic20 (or equivalent machine) thinking they could do something useful with it, here is some relief! I have written the shortest accounting program in history - it will fit on a Vic20 with 4k and can be modified to run on any computer that can handle string arrays. The system is in two programs. The first sets up the accounts while the second actually does the entries and prints the reports. An accountant would probably be shocked by the lack of features in this program. If you want features, buy a bigger machine next time! Just a note on the listings; a C means the Shift+Home keys (clear screen), a D means press the cursor-down key (puts the cursor down one line).

```
1 REM PROGRAMMED BY GARY FISHER 84/1/10
5000 REM START OF INITIALIZATION ROUTINE
5005 PRINT"C INITIALIZATION"
5010 PRINT"SECTION"
5015 PRINT
5020 PRINT"ENTER MAXIMUM NUMBER"
5025 INPUT"OF INCOME ACCNTS";MI
5030 INPUT"OF EXPENSE ACCNTS";ME
5040 DIM IN(MI),INS$(MI),EX(ME),EX$(ME)
5042 FOR X=1 TO MI:IN$(X)="XXXXX":NEXT X
5044 FOR X=1 TO ME:EX$(X)="XXXXX":NEXT X
5050 PRINT "C ENTER THIS DATA:"
5060 PRINT"BEGINNING BANK BAL."
5070 INPUT"DOLLARS:";BC
5080 PRINT "C INCOME ITEMS"
5090 PRINT"TYPE END AT ITEM NAME TO STOP"
5100 PRINT"EXAMPLE:"
5110 PRINT"ITEM NAME: WHEAT"
5120 PRINT"ITEM CODE: WHT"
5130 PRINT"(ITEM CODE MUST BE"
5140 PRINT"THREE CHARACTERS!)
5150 PRINT"BEG. BAL.: 20000"
5160 INPUT"PRESS RETURN";X$
5170 FOR X=1 TO MI
5180 PRINT" C INCOME ITEM #";X
5190 PRINT
5200 PRINT"TYPE END AT ITEM NAME TO STOP"
5210 PRINT
5220 INPUT"ITEM NAME:";Y$
5230 IF X$="END" THEN 5320
5240 INPUT"ITEM CODE:"Y$
5250 IF LEN(Y$)<>3 THEN 5240
5260 IN$(X)=Y$+X$
5270 INPUT"BEG. BAL.";IN(X)
5280 PRINT
5290 INPUT"CHANGE DATA (X/N)";X$
5300 IF X$="Y" THEN 5180
5310 NEXT X
5320 PRINT" C EXPENSE ITEMS"
5330 PRINT"TYPE END AT ITEM NAME TO STOP"
5340 PRINT"EXAMPLE:"
5350 PRINT"ITEM NAME: SEED"
5360 PRINT"ITEM CODE: 450"
5370 PRINT"(ITEM CODE MUST BE"
5380 PRINT"THREE CHARACTERS!)
5390 PRINT"BEG. BAL.: 1245.23"
5400 INPUT"PRESS RETURN";X$
5410 FOR X=1 TO ME
5420 PRINT" C EXPENSE ITEM #";X
5430 PRINT
5440 PRINT"TYPE END AT ITEM NAME TO STOP
5450 PRINT
5460 INPUT"ITEM NAME:X$
5470 IF X$="END" THEN 6000
5480 INPUT"ITEM CODE:';Y$
5490 IF LEN(Y$)<>3 THEN 5480
5500 EX$(X)=Y$=X$
5510 INPUT"BEG. BAL.";EX(X)
5520 PRINT
5530 INPUT"CHANGE DATA (Y/N)";X$
5540 IF X$="Y" THEN 5420
5550 NEXT X
6000 PRINT" C INSERT DATA TAPE"
6010 PRINT"ENTER FILENAME"
6020 INPUT FI$
6030 OPEN 1,1,1,FI$
6040 PRINT#1,BC
6050 PRINT#1,MI
6060 PRINT#1,ME
6070 FOR X=1 TO MI
6080 PRINT#1,IN(X)
6090 NEXT X
6100 FOR X=1 TO MI
6110 PRINT#1,IN(X)
6120 NEXT X
6130 FOR X=1 TO ME
6140 PRINT#1,EX(X)
6150 NEXT X
6160 FOR X=1 TO ME
6170 PRINT#1,EX$(X)
6180 NEXT X
6190 CLOSE 1
7000 PRINT" C REWIND THE DATA TAPE"
7010 PRINT"AND GO RUN THE MAIN"
7020 PRINT"ACCOUNTING PROGRAM"
7030 END
```

Type in this program and run it once to start up the accounts. You could probably get 10 income and 20 expense accounts on a 4k Vic. The three character item codes could be either numbers or codes, it doesn't matter to the program. The accounts and the farm cash beginning balance are then stored on a tape for use by the main program which will follow next month. If you have another type of computer, such as a TIMEX or ATARI the statements should be similar, except for the clear screen, string and tape output commands. You are on your own for conversions.

Note: We will not supply copies for the program on tape, you will have to type it in yourself!

THE SIMPLEST ACCOUNTING PROGRAM OF ALL TIME!!! (continued)

Here's the main accounting program used to enter data and receive reports. Because of memory restrictions, there is no provision for hard copy. If you have a printer and some extra memory, you can type in some extra statements to give hard copy. The data storage is on a separate data tape which is recorded at the end of every session. It may be wise to keep two tapes, one with the most current data and one with the old data. Don't record over the same tape unless you have a back-up!

```
5000 PRINT" C INSERT DATA TAPE"
5020 INPUT"ENTER FILENAME";F1$
5030 OPEN 1,1,0,F1$
5040 INPUT#1,BC
5050 INPUT#1,MI
5060 INPUT#1,ME
5065 DIM IN(MI),IN$(MI),EX(ME),EX$(ME)
5070 FOR X=1 TO MI
5080 INPUT#1,IN(X)
5090 NEXT X
5100 FOR X=1 TO MI
5110 INPUT#1,IN$(X)
5120 NEXT X
5130 FOR X=1 TO ME
5140 INPUT#1,EX$(X)
5150 NEXT X
5160 FOR X=1 TO ME
5170 INPUT#1,EX$(X)
5180 NEXT X
5190 CLOSE 1
5200 PRINT"C COMPUFARM ACCOUNTING"
5205 PRINT" PROGRAM MENU"
5210 PRINT" D 1 = ADD NEW DATA"
5220 PRINT"2 = PRINT REPORTS"
5230 PRINT"3 = END PROGRAM"
5240 INPUT"ENTER CHOICE";CH
5250 IF CH<1 OR CH>3 THEN 5200
5260 ON CH GOSUB 6000,8000,10000
5270 GOTO 5200
6000 REM ADD DATA SUBR
6010 PRINT" C ADD DATA"
6020 INPUT"<1>NC. OR <E>XP. ";CH$
6030 IF CH$<>"I" AND CH$<>"E" THEN 6020
6040 INPUT"ITEM CODE:";X$
6050 IF CH$="E" THEN 6090
6060 FOR X=1 TO MI
6070 IF X$=LEFT$(IN$(X),3) THEN AC$=EX$(X):GOTO 6200
6080 NEXT X:GOTO 6040
6090 FOR X=1 TO ME
6100 IF X$=LEFT(EX$(X),3) THEN AC$=EX$(X):GOTO 6200
6110 NEXT X:GOTO 6040
6200 AC=X
6210 PRINT" D ACCNT NAME: ";MID$(AC$,4,255)
6220 PRINT" D ACCNT BAL.";
6222 IF CH$="I" THEN B=IN(AC):GOTO 6226
6224 B= EX(AC)
6226 PRINT B
6230 INPUT" D AMOUNT";A
6240 IF CH$="E" THEN 6300
6250 IN(AC)=IN(AC)+A
6260 BC=BC+A
6270 RETURN
6300 EX(AC)=EX(AC)+A
6310 BC=BC-A
6320 RETURN
8000 PRINT" C REPORT PRINTER"
8010 I=0:FOR X=1  TO MI:I=I+IN(X):NEXT X
8020 E=0:FOR X=1 TO ME:E=E+EX(X):NEXT X
8030 PRINT"INCOME"
8040 FOR X=1 TO MI
8050 IF LEFT$(IN$(X),3)="XXX" THEN 8090
8060 IF X/20=INT(X/20) THEN INPUT"PRESS RETURN";X$
8070 PRINT MID$(IN$(X),4,255),IN(X)
8080 NEXT X
8090 PRINT"TOTAL INCOME";I
8100 INPUT"PRESS RETURN";X$
8110 PRINT" C EXPENSES"
8120 FOR X=1 TO ME
8130 IF LEFT$(EX$(X),3),="XXX" THEN 8170
8140 IF X/20=INT(X/20) THEN INPUT"PRESS RETURN";X$
8150 PRINT MID$(EX(X),4,255),EX(X)
8160 NEXT X
8170 PRINT"TOTAL EXPENSE";E
8175 PRINT"INC-EXP="I-E
8180 PRINT" D BANK BAL.";BC
8190 INPUT"PRESS RETURN";X$
8200 RETURN
10000 PRINT" C INSERT DATA TAPE"
10010 INPUT"ENTER FILENAME";FI$
10020 OPEN 1,1,1,FI$
10030 PRINT#1,BC
10040 PRINT#1,MI
10050 PRINT #1,ME
10060 FOR X=1 TO MI
10070 PRINT#1,IN(X)
10080 NEXT X
10090 FOR X=1 TO MI
10100 PRINT#1,IN$(X)
10110 NEXT X
10120 FOR X=1, TO ME
10130 PRINT#1,EX(X)
10140 NEXT X
10150 FOR X=1 TO ME
10160 PRINT#1,EX$(X)
10170 NEXT X
10180 CLOSE 1
10200 PRINT"C THANKS FOR USING ME!"
11000 END
```

VOLUME V, NO. 5, JULY, 1984

Provides some basic information for anyone wanting to program in FORTH,

A LANGUAGE FOR ALL SEASONS: SAVVY - PC

Open any computer magazine and the ads will all seem to literally scream at you from the pages. The noise level gets so high that good software, such as the SAVVY-PC from Excalibur Technologies is often drowned out in the din. SAVVY has been described as either an artificial intelligence language or a database management system. In fact it has elements of both. SAVVY is written in FORTH, which is one of the fastest and most efficient languages around. But SAVVY includes the power of pattern recognition. If you type in something that is misspelled, SAVVY will try and correct it for you. This is very useful for any application requiring test processing and the pattern recognition can give an uncanny feel of artificial intelligence. The SAVVY language is composed of COMMANDS which are the basic building blocks of the language and which can be combined to form TASKS. These tasks then become part of the language to be used in still larger tasks. The result is a language that seems to grow smarter and more powerful the more you use it. The data that SAVVY uses is called an ITEM. A collection of data items is called a FILE. With the power of the built-in commands and the pattern recognition, a programmer can write almost any application.

Let me give you an example: Let's say we want to write a program to calculate crop yields for a test plant in bushel/acre, given the type of grain, pounds harvested, % initial moisture, standard moisture, width and length of area harvested as variables. The formula used is:

$$Y = \left(A*\frac{100-B}{(100-C)} / WT.\right) / (D*E/43560)$$

where Y = the yield in bushels/acre; A = lbs. of grain harvested; B = initial grain moisture % age; C = moisture % for a standard bushel of grain; D = width of area harvested; E = length of area harvested and Wt. = weight of a standard bushel of the grain. The BASIC program would look like this:

```
5 REM NAME, WEIGHT OF STD BU,STD MOISTURE %
10 DATA "CORN",56,15.5
20 DATA "RYE",56,13.5
30 DATA "WHEAT",60,13.5
40 DATA "OATS",32,13.5
50 DATA "BARLEY",48,13.5
60 DIM C$(5),B(5),M(5)
70 FOR I=1 TO 5:READ C$(I),B(I),M(I):NEXT I
80 INPUT "TYPE OF GRAIN";G$
90 FOR I=1 TO 5
100 IF G$=C$(I) THEN X=I:GOTO 120
110 NEXT I:GOTO 80
120 INPUT "POUNDS OF GRAIN HARVESTED";A
130 INPUT "PERCENT INITIAL MOISTURE":B
140 INPUT "WIDTH OF AREA HARVESTED";D
150 INPUT "LENGTH OF AREA HARVESTED";E
160 PRINT " THE YIELD OF ";C$(X);"IS";
170 PRINT (A*((100-B)/(100-M(X)))/B(X))/(D*E/43560;"
BU/ACRE"
180 END
```

Great for anyone who is beyond spreadsheets and who wants a custom program without the custom price. A follow up to the earlier article.

A LANGUAGE FOR ALL SEASONS SAVVY-PC

(Continued from July)

Let's continue the example from last month, where we programmed a crop yield calculator in BASIC. Here's how it would look in SAVVY. All variables (items) remain active in the work space at all times in SAVVY. First, we create a file which contains the standard data for each grain.

```
CREATE a file called CROP DATA
```

(everything you type is in upper case, SAVVY returns with lower case)

```
File CROP DATA
   1 Key GRAIN
   2 Item STANDARD WEIGHT
   3 Item STANDARD MOISTURE
```

(an item in SAVVY can be called almost anything and be up to 80 characters long)

```
What would you like me to do now?
```

(this is SAVVY'S standard prompt)

```
COPY the "CORN" to GRAIN
```

(we now enter the data for the first grain)

```
What would you like me to do now?
COPY the 56 to STANDARD WEIGHT

What would you like me to do now?
COPY the 15.5 to STANDARD MOISTURE

What would you like me to do now?
SAVE a new record in the CROP DATA
```

(all of the information for Corn is saved on the disk; we can now ask for CORN and get all the data at any time)

To design a SAVVY program, we start from the top down. To do this, we list the general functions of our program. They are:

```
input all of the data
calculate the answer
printout the answer
```

We will combine all of these functions in one big task.

```
DEFINE a task called CROP YIELD CALCULATION
(DEFINE is one of SAVVY'S built-in commands, we then
go into the screen editor and type in the first task)

0 -- task CROP YIELD CALCULATION
1 INPUT ALL OF THE DATA
I have never seen INPUT ALL OF THE DATA before. (SAVVY
doesn't have this task in its dictionary)
Should I make it a task? Y
2 CALCULATE THE ANSWER
(we will look up the type of grain in CROP DATA)
3 PRINTOUT THE ANSWER
```

At line 3, the computer beeps and the line is changed to calculate the answer. You have just run into the most powerful feature of SAVVY: pattern matching. SAVVY takes what you just typed in and tries to associate it with its built-in vocabulary, which now includes CALCULATE THE ANSWER. We type D to delete line 3 and go into literal mode (where pattern matching is disabled) by pressing ESC AND C. After line 3 is entered again we switch back to free mode (pattern matching enabled). Type a Q to quit and SAVVY reports that the task only takes up 11 bytes.

Now we will define INPUT ALL OF THE DATA which was the first function we wanted to carry out.

```
0 - task input all of the data
1   PROMPT for TYPE OF GRAIN
```

(the PROMPT command uses the item name for the question so the name should be as descriptive as possible)

```
I have never seen TYPE OF GRAIN  before.
Should I make it an item? Y

2 GET record using TYPE OF GRAIN from CROP DATA
3 PROMPT for POUNDS OF GRAIN HARVESTED
4 PROMPT for INITIAL MOISTURE PERCENTAGE
5 PROMPT for WIDTH OF AREA HARVESTED
6 PROMPT for LENGTH OF AREA HARVESTED
7 CARRIAGE return
8 END (Task is 30 bytes)

What would you like me to do now?
```

What would happen if you had given grain not on the list? SAVVY will look at the grain and then call a standby task called REPORT GET ERROR. In this task, we just call INPUT ALL OF THE DATA again to get the same prompt. We could also have written a more complicated routine to pattern-match for the grain names and pick the closest match. What if we wanted a more detailed prompt? No problem; just rename the old item and all of the tasks that use that item will have the new name.

```
What would you like me to do now?

RENAME old name WIDTH OF AREA HARVESTED to new name
WIDTH (IN FEET) OF AREA HARVESTED

What would you like me to do now?

DETAIL the INPUT ALL OF THE DATA
INPUT ALL OF THE DATA (a Task)
(We will list out the task after changing some of the
item names)
1 PROMPT for TYPE OF GRAIN
2 GET record using TYPE OF GRAIN from CROP DATA
3 PROMPT for POUNDS OF GRAIN HARVESTED
4 PROMPT for INITIAL MOISTURE PERCENTAGE
5 PROMPT for WIDTH (IN FEET) OF AREA HARVESTED
6 PROMPT for LENGTH (IN FEET) OF AREA HARVESTED
7 CARRIAGE return
8 END (Task is 30 bytes)
```

Let's define CALCULATE THE ANSWER, the second function we wanted to carry out.

```
0 -- task CALCULATE THE ANSWER
1 SUBTRACT the INITIAL MOISTURE PERCENTAGE from   100
2 COPY the DIFFERENCE to ITEM1
  (SAVVY has up to 63 digits of precision!)
3 SUBTRACT the STANDARD MOISTURE from 100
4 DIVIDE the ITEM1 by DIFFERENCE
5 MULTIPLY the POUNDS OF GRAIN HARVESTED by QUOTIENT
6 DIVIDE the PRODUCT by STANDARD WEIGHT
7 COPY the QUOTIENT to ITEM1
8 MULTIPLY the WIDTH (IN FEET) OF AREA HARVESTED by
  LENGTH (IN FEET) OF AREA HARVESTED
9 DIVIDE the PRODUCT BY 43,560
10 DIVIDE the ITEM1 by QUOTIENT
11 COPY the QUOTIENT to ITEM1
12 END (Task is 88 bytes)
```

You see that a formula must be represented in smaller portions than in BASIC. From each calculation, the result is stored in the appropriate item i.e., MULTIPLY yields PRODUCT.

We finally define PRINTOUT THE ANSWER, the final task.

```
0 -- task PRINTOUT THE ANSWER
1 DISPLAY the "THE YIELD OF"
  (The display task does not issue a carriage return,
  so it is easy to string information together on one
  line)
2 DISPLAY the TYPE OF GRAIN
  (The grain's name is displayed here)
3 DISPLAY the "IS"
4 DISPLAY the ITEM1
  (The number is displayed here)
5 DISPLAY the "BUSHELS/ACRE"
6 CARRIAGE return
  (Go to a new line)
7 END  (Task is 51 bytes)
```

The finished result looks like this:

```
What would you like me to do now?
```

(We type in the name of the task to be done. SAVVY will understand this misspelling!!)

```
CROP YIELD CALCUL
Enter TYPE OF GRAIN CORN
Enter POUNDS OF GRAIN HARVESTED 50
Enter INITIAL MOISTURE PERCENTAGE 25.5
Enter WIDTH (IN FEET) OF AREA HARVESTED 6
Enter LENGTH (IN FEET) OF AREA HARVESTER 40
THE YIELD OF CORN IS 142.8768242 BUSHELS/ACRE.

What would you like me to do now?
```

SAVVY also comes with a database sampler. This pre-written database program is not quite up to DBASE II complexity, but it is more advanced than many simple file handlers. You can also modify this database program for your own applications, since the whole thing is written in SAVVY.

Who then can use SAVVY? It is for someone who is beyond spreadsheets and wants custom programs without a custom price. It is easier to learn and use than BASIC or PASCAL but it still requires the ability to think logically. It forgives the poor typing and spelling most of us seem to have. The complexity of SAVVY seems to match the complexity of the job you want to do. If you want complexity, the pattern matching facility has just been tapped by SAVVY users. But no matter how complicated the program, SAVVY tasks are completely self-documenting. As computer languages go, SAVVY is not too expensive at $395 (U.S.) and includes its own operating system (giving the IBM PC 400k storage per disk). SAVVY will run on IBM compatibles such as Compaq, Columbia, Tava's etc., as well as the PCjr.

An informative article which provides operators with a checklist to go over before ordering by mail.

SHOULD YOU BUY THROUGH MAIL ORDER?

It seems like every time I open up a newspaper or magazine, I'm bombarded with ads for computer hardware and software. Just looking over the "July Specials" tempts me to race to the phone and place an order for a new piece of hardware or software at a hot price.

Ordering computer hardware or software by mail can have its advantages and disadvantages. Following are some of the pros and cons of mail order buying, and a few tips that can come in handy when ordering by mail.

Why order by mail at all? Well, unless you live in or near a large urban centre, chances are that your local computer store (if there is one) does not carry your favorite types of hardware, software or supplies. If you have your heart set on getting a Myopic III color monitor, for example, but your local dealer doesn't carry it, then mail order may be the answer. Open up any computer magazine or big city newspaper (THE GLOBE AND MAIL, Wed. or Fri. editions are my favorites), and you find all kinds of hardware and software, ranging from modems to monitors and from accounting to database software. Thus, one big advantage of mail order - it gives you a CHOICE.

Another advantage of mail order is PRICE. We all like to save a few bucks where we can. Typical mail order prices are 10-40% lower than those of local dealers (if they even carry the product). These fantastic deals can make your computer budget go a little further. At the very least, COMPARING mail order prices gives you an idea of what the similar products should sell for locally. This gives you an edge, especially when dealing on used equipment.

However, mail order has some disadvantages which should be seriously considered before selecting a mail order company and placing your order. Never decide on a mail order company on the basis of price alone. Some firms may not be in business long enough to deliver. Check back-issues of your computer magazines to see if the company has been around for at least two years.

One of the greatest disadvantages you face with mail order is PRODUCT SUPPORT. Let's face it: you can usually get the best deals from companies that operate as "box movers". These companies can offer tremendous savings over regular retail outfits because they do NOT offer product support, which can be OK if you are able to service or maintain the product yourself. Otherwise, the money you saved by buying through mail order can often be spent on servicing the product. On the other hand, some local dealers know diddly-squat about the product they sell, so you are no further ahead than with a "box mover". The trick is to find out about your dealer before you buy - shop around and know what you are getting into!

Non-delivery is another risk you take with mail order. Several things can happen after placing you order with a mail order company. If you send a cheque or money order (**NEVER** send cash) to a mail order company, always include your return address and the precise, exact description of the item you want. For example, write out that you are ordering a Myopic III 12" color monitor, as advertised in National Computing magazine, p. 45, vol 4, no. 7, July 1984. You can specify Canada Post or commercial carrier as the delivery service. If you live in a rural part of Alberta, then courier service is not feasible, as couriers only deliver to street addresses and are expensive (rest assured, they can always find you when it comes to billing time!). You may order by sending a letter with a cheque, money order or charge card number; few companies accept C.O.D. these days. A final disadvantage is that should your item get lost in the mail you may have a difficult time trying to track it down.

Another way to order is by telephone. Many mail order companies have toll-free "order lines" where you can order a product and pay for it over the telephone with a charge card number. Mailing time will be cut in half since you don't need to wait for your order to arrive at the company by mail. You can also get more details about the product, or ask questions like, "Is the item in stock, or is it back-ordered?"

There are big differences when ordering from a company in Canada versus a company in the U.S. The main differences are:

In Canada - you pay for delivery only. If ordering from a province outside of Alberta (eg. Ontario), you **DO NOT** have to pay the Ontario provincial sales tax.

From U.S. - you pay exchange on the dollar, duty (if applicable), federal sales tax and delivery charges. Be aware that many U.S. based companies tack on an additional charge for Canadian orders. Be sure to know the customs tariff number for the item you order. Revenue Canada officials are not computer experts; don't expect them to know the difference between a color monitor (3.9% duty) and a TV set (11.4% duty).

AN EXAMPLE: Let's suppose that you want to buy a Myopic III color monitor which you saw advertised in a U.S. computer magazine for $439 (U.S. funds) and in THE GLOBE AND MAIL newspaper for $629 (CAN. funds). Which is the better deal?

1. Order from Canadian company:

1 color monitor @	$629
Delivery	20
Total Cost:	$649

2. Order from U.S. company:

1 color monitor @		$439 U.S.
for Canadian orders add 5%	22	
sub total:		$461

NOTE: exchange rate of 1.33: 1.33 x $461 =	$613 CAN.
add duty of 3.9% (3.9/100) x $613 =	24
sub total:	$637
ADD: Federal sales tax of 9% (9/100) x $637 =	57
Total cost =	$694

You are ahead by $45 if you order the monitor from a Canadian rather than a U.S. company. Also, you don't have to run into Edmonton, Red Deer or Calgary to pick it up from customs. But keep in mind the risks of sending back defective items across the border for repair or exchange. Should this happen, to avoid paying duty twice you must personally intervene with Canada Customs by filling out an armload of forms.

One last word. A week ago, I ordered a few boxes of floppy diskettes by telephone from a dealer in Toronto. I paid for the disks with my charge card, and asked for the order to be sent via Canada Post. The disks arrived two days later, and I saved over $65 without having to run to a Calgary or Edmonton computer store. That's pretty good! If you are willing to take the risks, then why not consider mail order?

VOLUME V, NO. 8, OCTOBER, 1984

HARDWARE REVIEW: THE EAGLE TURBO PC

The EAGLE TURBO PC is another personal computer in the legion of IBM PC compatibles available in the marketplace. Special thanks to Terry Campbell of Alpha Computers at 12318-111 Ave., Edmonton, Alberta for providing us with an Eagle to try out.

Several versions of the Eagle are available. The one we tested came with:

256k bytes RAM on the main board (room for 512k)
1 - internal half-height 5 1/4 double-sided 320k byte floppy disk drive
1 - internal half-height 10 megabyte hard disk drive
1 - Monochrome (green) monitor

The EAGLE TURBO PC has 8 expansion slots on the main circuit board. Four of the 8 slots on the machine we tested were taken up by:

1 - Parallel printer adapter card
1 - Monochrome display adapter card
1 - Floppy disk drive and clock/calendar adapter card
1 - Hard disk drive adapter card

This leaves 4 slots available for additional IBM PC compatible expansion cards. For example, one slot could be used for a multi-function card, giving the Eagle more memory (up to its limit of 640k bytes), a serial port and an additional parallel port.

The Eagle sports an INTEL 8086 MPU running at either 4.77 MHz or 8.0 MHz. The higher speed is user-toggled by a switch located on the computer's front panel. Although this doesn't affect disk drive performance, it results in a micro that can run at nearly twice the speed of and IBM PC.

The Eagle's keyboard has 84 keys, one more than Big Blue's. The extra key is an ENTER key located on the extreme right of the number pad. Touch typists will feel at home with the Eagle's IBM SELECTRIC typewriter configuration. The shift keys are where a typist would expect them to be, unless you are used to an IBM PC's keyboard, in which case the Eagle's keyboard will be frustrating until you get used to it.

The full-travel keyboard (keys go all the way down before the keystroke is registered) had a soft "mushy" feel to it. I didn't like the keyboard because it lacked tactile feedback. I like keys that click or at least offer some resistance when a key is depressed so I know when I've hit something. With the Eagle, I had to watch the monitor to see if the keystrokes had registered.

Some nice features of this keyboard include a raised slot on the F and J keys and a raised dot on the 5 number pad key which make it easy to find home position keys without having to look for them. Another nice feature are LED's (Light Emitting Diodes) built into the NUM LOCK and CAPS LOCK keys. These LED's light up when the key is active; no more guessing if your number pad is producing numbers or controlling the cursor.

The Eagle can run different types of monitors, depending on which video card is installed. The one we tested had the standard high-resolution green monochrome monitor running off Eagle's monochrome adapter card. This monitor gets top marks for clarity and glare control. The surface of the monitor is covered with a nylon mesh to reduce glare and reflection from light sources. Power to the monitor is supplied from a power outlet located on the Eagle's rear panel. Other video interfaces available include a medium-resolution, Color-Graphics display card, capable of displaying text and graphics as: 160 x 100 pixels and 16 colors, 320 x 200 pixels and 4 colors or, 640 x 200 pixels with a block background and one color foreground. These are the same specs as the IBM PC color graphics card. According to the Eagle's documentation, you can install any video card that will work with the IBM PC.

Opening the main system unit (to add memory, cards, access to internal DIP switches) was easy - there are only 6 screws to remove. There was, however, a cable running from the main board to the turbo switch (to set high/low processing speed) located on the front panel that had to be carefully unplugged to prevent damaging the connections. This made getting into the machine a little tricky. The front panel is styled to accommodate half-height disk drives. Although the floppy disk drive controller card had another connector for a second floppy drive, there was no room for it.

Inside, the expansion card slots are mounted sideways on the PC board. This allows for the business end of the expansion cards to point out from the right side of the computer chassis. From here you open a panel door on the side of the chassis to easily plug in printer cables or other peripherals without having to pull the computer away from the wall to get to the back panel, like most computers.

The power switch was a rocker switch on the left side of the cabinet. In addition to the routine software reset available on most IBM PC compatibles, there was a hardware reset switch on the back panel of the computer. This is good, since some software 'locks up' the keyboard in the event of a crash.

The hardware has the typical 90 day warranty on parts and labour. Our dealer provides an additional 1-year warranty on parts alone, with 30 days on the repair/replacement warranty. Your dealer may provide additional coverage.

NEXT MONTH: The Eagle Turbo PC Review, Part 2.

EAGLE TURBO PC Review - Continued from last month

DOCUMENTATION: The Eagle comes with three binders of documentation including:

- EAGLE TURBO PC User's Guide
- MS-DOS 2.0 Operating System Manual
- BASICA Programmer's Manual

These manuals contain all the information you will need to get started with your Eagle. However, you will still need the documentation for software packages like VISICALC or VOLKSWRITER, or a good BASIC guide if you want to learn how to program in BASIC. Like so many of the IBM PC compatible computers, the Eagle's documentation comes packaged in the now familiar small, shelf-sized, linen-lined box style, so it will match your IBM PC compatible software documentation.

SOFTWARE: The Eagle ran just about all the software I tested. To check compatibility claims, my software was configured to run on an IBM PC with a monochrome video display. Here are the results:

- VISICALC (256k byte version) worked perfectly.
- PC DOS 2.2 and IBM PC BASICA caused the Eagle to re-boot itself - used MS-DOS and the BASIC provided by Eagle.
- LOTUS 123 worked, except that PRTSC caused the system to crash when no printer was attached.
- PC-TALK serial port not available - this program could not be fully tested. However, the Eagle attempted to write data to a definition file used by PC-TALK which caused the data file to be wiped out!
- ADA BASIC programs ran well under Eagle's BASICA. However, the cursor control keys did strange things to the ADA input subroutine (depressing any cursor control key removes 2 char. on the left - there are some differences in the BASIC language).
- DBASE II ran fine until I tried to sort a database and store the resulting index file. The Eagle stored an empty index file! This was the case using PC-DOS 1.1, 2.0 and 2.1 as well as MS-DOS 2.0 which was supplied with the Eagle.
- VOLKSWRITER ran fine, although a serious user would transfer Volkswriter to the hard disk.

I tried various file utilities including a BASIC file unprotector. These did not work under the Eagle's MS-DOS 2.0.

SUMMARY:

The Eagle PC is a serious contender in the IBM PC compatibility race. It reads/writes diskettes formatted by the IBM PC and could run most (but not all) of the software I had available for a similarly-equipped IBM PC. Its processing speed can be selected by the user to run at 4.77 MHz (like the IBM PC) or at 8.0 MHz. The faster speed does not improve disk drive performance, but does improve things like calculation/sort times. It should be noted that the Intel 8086 runs at 8.0 MHz regardless of switch settings; the speed switch only enables or disables wait states inside the machine.

The hard disk drive supplied with the EAGLE TURBO PC seemed fast and gave me no problems. Eagle provides a utility program that sets the hard drive's READ/WRITE head into a travel/ standby position and recommends the use of this program before the computer is turned off or transported to prevent damage to the drive or to record data. Other hard drives can be set up to automatically return the read/write heads to a "landing zone" after a read/write operation. Why not Eagle? What happens in the case of a power-out, or a forgetful user?

The main system unit and monitor are well built and sturdy. The main circuit board is well designed, well built and ran cool. To add more memory, the main board required the removal of both the hard and floppy disk drives, as well as the disconnection of the wires leading from the main circuit board to the front panel-mounted high/low speed switch. No big task for the seasoned computer veteran, but complicated enough to make the first-time user uneasy about taking apart his multi-thousand dollar investment.

The keyboard was too "mushy" for my liking; it was like typing on jello. I like a key that has some resistance and a firm "click" to it when depressed. I don't like a keyboard that won't let me rest my fingers on the keys.

The monitor system was first class, but the monochrome adapter card lacked a parallel printer port, like IBM's. That means you have to buy a separate printer adapter card or a multi-function card with a printer port on it. On the other side of the coin, IBM PC users with the color graphics adapter also have to buy a separate card to get the printer port.

The Eagle ran most of the software the typical user would probably want to run, including VISICALC, LOTUS 123, various word processors and database managers. It also ran most basic programs written for the IBM PC, but did not run DBASE II correctly. Nor did it work with a BASIC unprotected utility.

In conclusion, the EAGLE TURBO PC is a fine piece of hardware that merits serious consideration. However, as with every IBM PC "compatible", a potential purchaser MUST try his software on the machine before signing the cheque. I like the 8 MHz speed of the Eagle, the hardware reset switch and the way the slots are set up sideways inside the Eagle with an access door on the right side of the main system unit. I dislike the mushy keyboard and would replace it at first opportunity. Also, I like to have two floppy disk drives and a hard drive, even if the hard drive is an external unit. Backing up a floppy disk means copying the contents of the floppy onto the hard drive, and recopying that onto a fresh floppy. Two steps, even though a semi-sharp user would probably partition his hard drive and set up a batch program to do the copying for him.

PRICES

Retail price for the EAGLE TURBO PC ranges from $7450-$7999. A similarly equipped IBM PC/XT sells for $7560. The portable Eagle with one 10 megabyte hard drive and one floppy drive with 128k lists at $5980. Dealers may sell for less.

COMPUTERS FOR CHRISTMAS

This is the time of year when people call up wondering "What inexpensive computer can I buy for the kids that has lots of educational software but will also do the bookkeeping, keep the dairy and field crop records, link up with Grassroots and I.P. Sharp, runs VISICALC and DBASE II, and can be programmed in APL, FORTH, PASCAL, and FORTRAN?" The answer is much like last years - there is no such animal! But continued developments in software and hardware are resulting in computers that are cheaper and more powerful. While the "ideal" computer isn't here yet, let's take a look at some of the more popular machines that are available here today.

Computers for Christmas is split into three major price categories. The least expensive computer systems fall into the home computer category, costing anywhere from $300 - $1400. The mid-range machines cost anywhere from $1400 - $2400. The third and last category are the full-blown business computers which can start around $2000 and go up from there (the sky is the limit!). These prices are based on a system which includes the computer, monitor, disk drive and printer. Let's look at a few of these machines in more detail.

First, let's look at the really low-end machines costing about $1400 or less. Computers in this range make nice Christmas presents, starting with computers like the Radio Shack CoCo2 ($300), the Coleco Adam ($500) or the Commodore 64 ($350). All of these machines are home computers and shouldn't be confused with, or expected to do, all the things that more expensive "business" computers do.

The CoCo2 is an example of a home computer that can be bought "for the kids" without going broke. But, except for the home applications, (educational and game software put out by Radio Shack), the CoCo2 suffers from limited software availability, especially where agricultural software is concerned. The CoCo2 Speculator package, for example, is a low-power spreadsheet when compared to its big cousin, Visicalc (which isn't available for the CoCo2). Also, the CoCo2's video display (32 columns) doesn't allow for much data to be displayed at any one time. The optional disk drive unit for the CoCo2 ($500) only reads/writes diskettes for the CoCo2, making this machine almost as stand-alone as the Coleco Adam. This is a nice, inexpensive home machine, and OK to play with. If you want agricultural applications, then you will have to write them yourself, within the limitations of the hardware.

The Coleco Adam computer package (computer unit, printer, tape storage unit) is unique in the sense that you can have the whole computer system for about $500, which includes a letter quality printer. Unfortunately, the Adam has the same problem as the CoCo2 - a lack of software. Sure, you can play games and do word processing on the Adam, as well as get some nice printed output from the letter-quality printer, but there isn't anything in the way of agricultural software for it, even from Coleco. As with any computer, if there isn't any software support by the industry, the computer soon fades away. The Coleco Adam may be just the machine to buy for a cheap home system, but industry rumors indicate that it won't be around much longer. This is still an OK machine to play with, just as long as you don't expect it to "keep the books" for a 5,000 head feedlot.

The best deal of the bunch is the Commodore 64, which sells for $300 - $400. Throw in a disk drive ($350) and a printer and connect the beast to the home TV, or pick up Commodore's color monitor for video display. Add Multiplan ($130), Digipac ($200) and some games/educational software, and you have a fairly reasonable home system that can be used by the kids as well as for the farm. Adding a modem and some software gives you a terminal for Grassroots. Just remember that if you are planning to upgrade to a more sophisticated system, don't expect to take your records or accumulated software with you.

A definite plus on the side of the C64 is that several sophisticated software packages, along with a variety of games and education software are available for this machine. This strong industry support for the C64 indicates that it will be around for a while yet.

The second major category of computers falls in the $1400 - $2400 range. Here we find machines like the Apple II series, IBM PCjr ($1700) and the TRS-80 Model IV ($1500, base price), all of which have many software packages available for both business and home applications. The trick here is to decide if the machine is for the kids or for the farm. For example, the TRS-80 IV doesn't support color or sound and wouldn't be the best choice if the kids want a lot of full-color action games, but it could be a satisfactory small-business machine.

The upper category that we will consider here are machines costing $2400 plus. This includes the more powerful Radio Shack computers, machines like the Kaypro and the new Kaypro 16 (you guessed it - it runs MS-DOS), the MacIntosh and of course, the IBM PC and its clones. They include Radio Shack's latest offering, the Tandy 1000 ($1800 introductory base price). The Tandy 1000 is rated at about 80 - 90 per cent compatible, as are most available MS-DOS machines. As always, check out the software on the machine before you buy. In this category you can easily write a cheque for $5000 and then go out to buy more peripherals and software packages. That's a considerable investment for a computer, a "home" machine. Life, after all, is just not complete without the latest version of Flight Simulator and your very own speech synthesizer.

The Apple MacIntosh (about $2700 for the basic 128k machine) has acquired much wider industry support than it had one year ago. In addition to such packages offered by Apple like MacWrite, MacDraw, MacProject, and MacTerminal, other software is available from third-party software companies for the Mac to make it a more useful business tool. Examples include spreadsheets like Multiplan, database management systems like PFS:File, theBase, and Helix and accounting software like Peachtree's Back to Basic package. Agricultural software like Harris Technical Systems "Profit Projections" and other packages are now available for the Mac. Expect Lotus 123 and some nifty programming languages like PASCAL and C to be available sometime in '85. This makes the Mac an interesting machine to watch, especially since the 512k Macs ($4700) are now available. Upgrades to turn a 128k Mac into a "fat" Mac (512k) are also available ($1500).

Software is not a major problem for most of these more expensive machines, except perhaps the Mac - and this will change. But as with any high-end machine, remember to define your needs and wants before you decide that you absolutely have to have an expensive computer system. Then buy according to your needs. On the other hand, there's that old saying "You can tell the men from the boys by the size and price of their toys"!

VOLUME V, NO. 11, JANUARY, 1985

TINA IS HERE...WELL, ALMOST

TINA stands for Tele Information Network of Alberta and will soon provide a means for both private and party-line users to access certain information providers like GRASSROOTS at reasonable telephone access rates. The concept is similar to the SASK TEL arrangement, complete with "plea" devices. TINA will allow a user to connect his telephone to a modem (and hence his computer) with that plea device (plea box) between the modem and telephone. According to Altel Data, the plea box will rent for $4.00 per month and you will need it when you want to use your computer and modem on the party line. The box sets off an audible alarm when your neighbor picks up his telephone, and is your cue to get off the line. No longer will you wonder "hmmm..., is that someone on the line messing up my data transfer or are those just parity errors?"!

The heart of the TINA system lies in a telephone switching system in Nisku, just south of Edmonton. This is how it works: An information provider (IP in consultant's lingo) pays Altel Data money to have a telephone number on the system. The IP also pays to get a line out from their location to the switch in Nisku. Then when your computer gets the urge to talk to the IP's computer via telephone, it dials (or gets you to dial) the special number in Nisku, and voila - bit transfer time!

Now, the big advantage to TINA is that instead of paying regular long distance rates of anywhere between 30 to 50 cents a minute, you pay a set rate of 11 cents a minute (8 a.m. - 6 p.m. Mon. - Fri. - "prime time") or 9 cents a minute (after 6 p.m. and weekends - non-prime time). There is also a 20 cent setup charge. Although not super cheap, this means the phone charge to reach Nisku will be $5.40 - $6.60 per hour (plus the 20 cent setup charge for each call). This does not include the $4.00 monthly rental fee for the plea device, or the $30.00 installation fee for the plea box. Also, this does not cover any additional charges by the IP, since the costs of getting the IP out to the Nisku exchange will be looking at up to 25 cents a minute total on-line charge, which is comparable to current direct distance dialing charges in Alberta.

At the time of writing, there are as yet no IP's available through the TINA system. Altel Data is, however, negotiating with a number of IP's, including Grassroots (Infomart). According to Altel Data, look for the University of Alberta Plato system and GRASSROOTS to be on the system by March, 1985. As yet, there are no plans to connect a DATAPAC port to TINA.

VOLUME V, NO. 12, FEBRUARY, 1985

HARDWARE REVIEW - TANDY 1000

Perhaps as testament to IBM's strength in the market place, even Radio Shack has now gone into the "me too" world of IBM-PC compatibles, with the introduction of their TANDY 1000.

The TANDY 1000 has recently appeared on the market with a large advertising campaign. Radio Shack is claiming it gives "more features than an IBM PC at substantial savings...plus you get DeskMate disk software at no extra cost!" They claim it is "CLEARLY SUPERIOR"! Maybe ... but the question is: To what?

We have just finished a one week trial with a TANDY 1000 , and I am afraid that I cannot agree with their claim to superiority over an IBM PC. It is a good machine, but I feel that it should be compared more to an IBM PCjr, for a few important reasons. The following table outlines a few major differences between the TANDY 1000, the IBM PC, and the IBM PCjr:

Feature	Tandy 1000	IBM PCjr	IBM PC
Parity	NO	NO	YES
DMA	NO	NO	YES
# SLOTS	3	1	8
MAX BOARD LENGTH	10"	N/A	13"
MAX MAIN MEMORY	128K	64K	256K
MAX TOTAL MEMORY	640K	640K	640K
BASIC IN ROM	NO	YES	YES
VIDEO ON MAIN BOARD	YES	YES	NO

The meaning and significance of each of these terms is:

PARITY: When you have 128k of memory that equals 1,048,576 bits of memory, after a random period of time, it is possible for an error to occur in any of these bits. And if the error is an area of memory where your data is, then your data is wrong. Fortunately these errors don't happen very often, but the consequences can be very serious when they do. Parity is a technique that uses an extra bit of memory to let the computer know when an error has occurred in memory. It is debatable whether with 128k it is required, but the PC does have it. Neither the TANDY or the Jr. do.

DMA stands for Direct Memory Access, and is an important feature, The PC has a special chip that handles all data transfers between memory and the disk drives, leaving the CPU free to do other tasks such as servicing your modem, and/or printer. etc. Without it, the CPU has to do all the work, which slows down the transfer speed. Our simple tests indicated a 15-20% slower speed reading or writing the disks. It also led to problems when we were using the modem to download files from a Bulletin Board. Any time the disk drives came on to save the file, any characters that were still being sent through the modem were thrown away, and not saved. Once you do add memory through an expansion board though, you do get DMA. The price of a TANDY expansion to 256k is $399, and to get DMA you would have to purchase TANDY's board.

SLOTS means expandability, and versatility. Some people would say, the more the merrier! An IBM PC comes with 8 slots, but 3 of these would be needed for the disk drives, color graphics, and printer, leaving 5. The TANDY 1000 has 3 slots, and the JR. has 2. One is dedicated to a modem, and the other is dedicated to a memory expansion to 128k. The Jr. has a bus extension on the side which allows for future expansion.

MAX BOARD LENGTH: The depth of the TANDY leaves room for boards that are 10 inches long, and no longer. The PC has 13 inches, and as a consequence a vast majority of third party manufacturers make multi-function boards that are 13 inches long. You would not be able to use them in the TANDY. As well the mounting brackets on most boards are too long to fit without cutting or filing. It might seem that Radio Shack wants you to buy all your options from them.

MAXIMUM MEMORY: The TANDY has 128k of memory on the main board and is expandable to 640k just like the PC and Jr. However, as mentioned above, if you want to gain DMA, and have a board that is less than 10 inches in length, the only one to buy is the Radio Shack board. While they claim 128k of memory, our DOS utility CHKDSK indicated that there was only 112k of total memory. A little head scratching and poking into the insides of the TANDY revealed the reason: 16k was being used by the monitor circuit on the main board. When you have a PC and add the separate graphics board, it had 16k of memory on it, so you really would have 128 + 16 = 144k of memory. This 16k of memory in all cases is dedicated to the monitor, however. The situation with the PCJr is the same as the TANDY 1000, it uses 16k of the main memory for the screen, leaving 112k for you the user.

BASIC IN ROM: Basic on the TANDY is MS-BASIC and is bigger than the PC version. This is because the PC has some of the BASIC code in ROM chips on the main board, so it only has to add the code to handle disk drives and graphics into RAM. Net effect is that the TANDY has even less memory left for you to use. Some programs that require 128k of memory will not run on the TANDY.

VIDEO ON MAIN BOARD: Both the TANDY and the Jr. have all the circuits required to create colour graphics on the main board, while the PC requires a separate board. The TANDY and Jr. have better colour abilities than the PC, but there is a trade-off. With the PC, if things change, you can get better cards; with the other two, you are fixed, and cannot change. When our TANDY was doing a recalculation under 123 or BASIC, the monitor went very crazy, and the picture shook all over the screen. When we connected an RGB monitor it was alright. We hope that this is an isolated case, and not typical of the TANDY.

HARDWARE REVIEW - TANDY 1000 (CONTINUED)

Originally, we intended to make a more detailed comparison between the Tandy 1000, and the IBM PCJr. However, during the week of March 18 to 22, IBM announced that they will be ceasing production of Jr's in April. IBM says it has enough Jr's in stock to supply institutional and government purchases for some time. Following this announcement, it is unlikely that they will sell many Jr's to consumers. So much for our intended article! Instead we will do a little price shopping and comparing.

If you can accept Radio Shack's advertising, the Tandy 1000 is every "byte" as good as the IBM PC, and even better. Trying to say the Tandy is equivalent to or better than a PC is like comparing the PCJr to the PC; not even IBM tries to make a comparison like that. No matter what enhancements you add to the Tandy, you still won't have an IBM PC or all the flexibility that is built into it. What you probably have is a superior Jr.

Cost can be a legitimate reason to purchase one thing over another. An entry level Tandy (128k, 1 drive, green monitor) costs $1749 + $299 = $1978. An equivalent IBM PC would cost about $2444, so the Tandy offers a 24% or $466 savings. Let's see what it would cost to build a full-blown 640k system for each of the PC and the Tandy: first with the IBM PC, we could pick up a 64k unit with nothing in it for $1995. This will give us a base IBM PC which will guarantee 100% compatibility. Now we can start buying parts through mail order or discount houses. We can purchase 2 drives and a controller ($497), a color graphics card ($159), a top quality RGB color monitor($785), and a AST multi-function card (parallel printer, serial interface, clock) ($387), purchase 512k of memory chips ($264) and pay no more than $4087 (you see, you don't have to buy just IBM products; quite often third party parts are better and cheaper). The Tandy loaded the same way would cost $1749 for the base unit, $399 for the second drive, $799 for the color monitor, $399 for the expansion to 256k, $219 for 128k more of chips to get to 384k, $349 for the expansion to 512k, $219 for another 128k to get to 640k, and $149.95 for a serial card; for a total of $4282.95. The Tandy works out to $195.95 more, we have to purchase all Tandy parts, we are working the power supply to the hilt, don't have parity, and have a 15% slower processing speed.

DESKMATE SOFTWARE - There is a saying in the computer industry that free software is worth exactly what you pay for it. While the Deskmate software lacks some features, it is still useful enough to be the first software a beginner uses. It includes a word processor, a spreadsheet, a filer, telecommunications, a calendar, and a "mail" function.

The **TEXT** function has most of the standard features (word wrap, format changes, search and replace, inserting from other files, etc). The formatting is limited; for instance, you can't have one paragraph with a line length of 65 and another paragraph indented with a line length of 40.

The **WORKSHEET** is limited to 99 columns by 99 rows, and has adequate formatting, etc. It includes the normal formula operations (sum, count, etc.) but lacks financial or statistical formula operations. Formula entry is a little cumbersome because you have to refer to a cell by both the row and column. For example, the top left hand cell would have to be referred to as "C01R01", where in Lotus 123 it would be referred to as "A1".

The **FILER** is a very simple electronic file handling system. You can set up custom data entry forms, sort, search, print, or list the records. Its reporting abilities are limited.

The **TELECOM** program is an application designed for communication between the Tandy and another computer running a host program. Simply, it lets you connect your phone line (if you have the optional modem) and communicate with bulletin boards, etc. It allows only ASCII data, so it can't be used with GRASSROOTS. You **would** be able to connect with our Bulletin Board, but since it does not support the XMODEM protocol, you may have problems downloading program files.

The **CALENDAR** program is an "event scheduler". You can use it as a general purpose calendar to replace your pocket calendar and date book, but you can't carry it around in your pocket very well! You can search for birthdays or other important events, and get a week-at-a-glance schedule on screen or printer. Not all that handy in our estimation.

The **MAIL** feature supports a simple message handler. The idea is that if several people use the same computer (some can even use it by remote phone line) they can leave messages for each other. Seems to me that a piece of paper is more to the point, but what the heck, it is one more feature they have added, for those who want it.

CONCLUSION - Yes, the Tandy is a pretty good machine when compared to the IBM PCjr. Given the choice, I would purchase it over the PC Jr, especially now that IBM has announced that they are stopping production of the PCJr in April. However, when I have to ask myself whether to buy a PC or the Tandy, it would depend on how far I intend to expand in the future. If I was sure that I would not be expanding much in the future, I would be inclined to buy the Tandy. If I want to expand in the future, then I would buy the IBM PC even if it cost $500 more. Special thanks to Dick Spooner of Trendway Data Systems, Olds for the loan of a Tandy 1000 for this review.

COMPU-FARM SOFTWARE REVIEWS

In order that the programs which will be reviewed in coming issues will be compared fairly with one another, a set of common evaluation criteria have been established. The evaluation criteria lists all of the features and characteristics which will be considered when evaluating programs. Our criteria are broken down into two different types; general evaluation criteria which may be applied to any type of program, and specific evaluation criteria which are applicable to only one type of program. Here we present the general evaluation criteria which we use. In future months, we will present criteria specifically for accounting and physical record keeping systems.

PROGRAM EVALUATION CRITERIA - GENERAL

Friendliness

User documentation:
What types of documentation are present?
Are tutorial, alphabetic reference, quick reference, etc. sections included?

Manual quality:
Quality and number of illustrations?
Type of binding?

Error correction methods:
How are typing errors corrected?
How are errors in the records corrected?

Menu and/or on-line documentation:
Do the menus and documentation cover all parts of the program's operation?
Is there a facility to bypass menus?
Is on-line help provided?

Commands used:
Are the program commands easy to use?

SECURITY

Response to operator errors:

Keyboard errors:
What happens when control keys, the break key, etc. are hit by accident?
Is a printer not ready detected?
How is a wrong disk insertion handled?

Error checks:
Is all input checked to be within range?
Is confusion of numeric and character input handled well?

Backup procedures:
Is there provision for data backup?
Can the program be backed up?

Data security:
Is a password system included?

How useful is it?
Is there provision for recovery from forgotten passwords?

Efficiency

Response time:
What is the input response time?
How much time is needed to produce reports?
What number of disk accesses are required?

Output of data

Ease of interpretation:
Are all explanations contained in the reports?
Are clear, non-technical titles use?
Is there uniformity among similar forms?

Output abilities:
Are reports easily formatted?
Is the program's output available on screen, printer, disk, etc?

Input of data

What editing facilities are provided?
Is the use of upper & lower case supported?
How well are the input forms laid out?
Is there uniformity among the input forms?

Integration

What other programs can it be integrated with?
Is the format of the records on disk available?

Hardware requirements

What basic hardware is required?
Is any extra hardware/software required?

Maintainability

Is any technical documentation provided?

Level of dealer support:
Is a direct telephone number to the dealer/manufacturer provided?
Where is the dealer/manufacturer located?
Is the dealer reliable?
What is the program's update policy?
Is any training provided?
Is the source code available to the end user?
What is required to modify the program?
Was an interpreted (built-in) or a compiled (machine) language used?
What original language was used?
Is any additional software required to modify the program?

Licence requirements, Capacity and Cost

EXPLANATION OF GENERAL CRITERIA:

Friendliness describes the effectiveness with which a program interacts with its user. A good program is immediately comfortable to use, while a badly designed program will never be easy to use despite the owner's best efforts to learn. A system should be obvious enough and helpful enough so that it can be effectively run without spending an inordinate amount of time learning how to use it. Good documentation is important to friendliness, both in the manual and in the program. Documentation must at the same time provide an easy learning environment for the new user, as well as a quick source of information for the advanced user. Commands for the various program functions should be clear, straightforward, and easy to remember. Obscure codes, numbers, and instructions should be avoided. As humans must operate the program, errors should be quickly and easily correctable. Since the success of any computer system is dependent on the information placed in it by its user, no aspect of a program's operation is more important than the ease with which it may be used.

Security refers to the safety of information entrusted to the computer system. Important records stored on a floppy disk are valuable and fragile. While no program can protect the user from power or hardware failure, or poor disk handling practices, it should protect the data from all forms of reasonable human error or abuse. This includes provisions for things like keyboard errors (e.g. accidentally striking function or break keys), printers which are not ready, and the insertion of wrong disks into the machine. As well, the program should be able to handle invalid or incorrect inputs, and should detect badly formatted or impossible values for immediate correction. There must be provision for backing up both data and the original program at regular intervals. Some systems have provision for passwords to control access to the program and to the farm's data. The usefulness of these systems are often debatable, especially when removable diskettes are used, since in many cases the passwords are easily broken or gotten around. A solid locked drawer or a good hiding place is often a more secure arrangement than relying on a poorly made password system.

Efficiency refers to the program's ability to deal with increasing amounts of input. A program advertised as being able to handle 1000 accounts is of little use if it requires an hour to access each one. Most microcomputers are at the limit of their processing power when handling a medium to large size farm's records, and if not compensated for, this can result in long delays especially when floppy disks are being used. In considering efficiency, two areas are of interest. One is the response time, which is the time required after each entry is completed before the system is ready for another entry or command. The other is the amount of time required to generate reports. Affecting both of these times is the number of disk accesses required. A program which rarely accesses the disk drive will be fast, but will usually have a limited capacity because of the amount of data which will have to be stored in memory at one time. A program which accesses the disk often will be slower but will generally have a greater storage capacity.

Output of data refers to the usefulness of the reports and information returned to the user by the system. The reports generated should be easy to use and interpret, meaning that each report should be selfexplanatory and must include clear, non-technical titles. All reports should be as uniform in layout as possible among those of a similar type. A good system will also allow the user to obtain his reports in whatever medium desired: printed, on the screen, or on diskette. Printed output is used whenever a permanent copy of the computer's output is required - either for filing or for assistance in correcting errors. The screen is used whenever quick output is required for reference or short-term operations. Sending the output of an operation to disk file is done whenever it may be convenient to use that output in another program, for example in a word processor. Saving output to disk is a simple to implement, useful feature that most programs lack.

Input of data refers to how information is placed into the program. Good software will ensure that the user is constantly aware of what is expected of him, and what function each input serves. When considering input of data, look at how well the program can edit the input data, the layout of the input screens used, and the degree of uniformity among the various input screens used.

Integration refers to whether or not the records of one program can be used with another, similar program. For example, can records within an accounting program be used as input for a spreadsheet program (e.g. Visicalc) for planning purposes. Such an ability is a recent innovation in the software market for microcomputers and usually exists only within "families" of software from a single manufacturer. However, if the program can be made to save its records in a useful format (e.g. DIF format, or a simple ASCII file) on diskette, then a wide range of possibilities exist for other programs to use the records with a little programming.

Hardware requirements refer to the minimum size and capacity of a computer system required to effectively use the program including any extra equipment or software required, either as dictated by the manufacturer or by testing, whichever is greater.

Contrary to popular belief, any large computer program, like any other piece of equipment, requires **maintenance.** While a program does not wear like a machine does, other problems do arise with time. Errors are found in the program, new features are added, tax laws change requiring new information, and so on. In addition, as experience grows with the program, users may find features which they would like to have added, either by themselves or by a hired programmer. A program which doesn't allow for these changes will be of less value than one which is easily modified and updated. Factors that contribute to **maintainability** are the amount of documentation available on the program's organization and the degree of dealer support. A good dealer will be experienced with the program and will provide for help quickly, either through a direct telephone number or local help. The dealer should also be reputable, with good prospects for stability. It is through the dealer that any updates or revisions for the program will be received therefore, the dealer's and manufacturer's update policy is important. For the more advanced user (i.e. those who can do their own programming), the availability of the source code (the name of a computer program while it is still human readable, before it is converted into being machine readable) and the hardware and software requirements for modifying the program are considered to be part of maintenance.

When considering the purchase of a program, the terms of the **software licence** are often neglected. It is the software licence which spells out the rights and responsibilities of the manufacturer and user. Also in the software licence are the terms governing use of the program, including the purchaser's rights to copy or modify it. Before purchasing any computer program, make sure that the terms of the licence agreement are workable for both parties. The final two general criteria for each program are the **capacity** of the program, as well as the standard or average **cost**.

GRASSROOTS WITH PERSONALITY II+ AND VIDEOTEX SOFTWARE

We have had the opportunity to use two different software packages that allow us to connect the GRASSROOTS information service: PERSONALITY II+ for the IBM PC (and compatible) and Manitoba Telephone System's VIDEOTEX DECODER SOFTWARE for the Commodore 64. What follows is a brief review on each:

PERSONALITY II+ requires an IBM with color graphics card, 192k memory, one drive, and a modem. While they say you have to have a color monitor, this is not strictly true. You can get away with a monochrome, but some information is not readable, and you will be missing a lot. They also say it is better if you have a better graphics card than the IBM, (one that gives 8 colors for example), but we have been using the regular 4 color IBM card with no problems. Personality II+ allows you to store screens of graphs, etc. to disk and print them out later when you are off-line and not paying for the connect time. It also allows connecting to regular "ASCII" services such as our bulletin board. It is available from MicroStar in Ottawa for $199 + $4 mailing.

VIDEOTEX DECODER SOFTWARE - the Manitoba Telephone System has published this program for the Commodore 64. It supports all the graphic functions, but the version we tested did not allow saving screens to disk (apparently a version is expected that will allow this). The resolution did not seem as good as Personality's, but this is probably due to the Commodore's screen. It is available for $99.95 from Infomart.

VOLUME VI, NO. 2, APRIL, 1985

Although this is old news, IBM still deserves recognition for their contribution.

SCOOP!!!!

On April 18, the University of Alberta and IBM made an announcement that under a cooperative agreement, more than $2.2 million in equipment and personnel were being donated by IBM to be used in a project in educational computing. The equipment (which consists of over 180 IBM Personal Computers and a 4341 mainframe system) will let the University of Alberta become the hub of a new provincial educational computer network, centered in the Faculty of Education.

As part of this agreement, Alberta Agriculture will be receiving 20 Portable Personal Computers for use in mobile classrooms, travelling the province to provide computer training and instruction to rural communities. We are very excited about this new project and will supply more details when they are available.

HARDWARE REVIEW - SANYO MBC-775

It seems that every time we turn around, someone else has built a "newer and better" IBM PC compatible. This begs the question: Why would anyone buy a compatible, when they can get the real thing? The hard truth is that nothing can be 100% compatible without being 100% illegal, due to copyrighted code in the BIOS ROMs. However, valid reasons to purchase a compatible over the real thing could be: increased function, cheaper price, better availability, better support, etc.

Now the same company that brings you TV's and stereos also brings you a personal computer. This month, I had the opportunity to play with a Sanyo MBC-775 from the Computer Shop, 3515 - 18 Street S.W., Calgary. This computer claims full compatibility with an IBM PC. (If this is starting to sound like a broken record, sorry, but that seems to be the way of the market! Does anyone have a non-IBM type computer to lend us?). It has some enhancements over the IBM, and as usual, it makes some trade-offs in the process. Its claims to fame are: 8088 processor that runs at 8 MHz (instead of IBM's 4.77 MHz, or 68% faster); built-in 9" colour monitor; transportability; two expansion slots that accept all applicable IBM cards; two 360k floppy drives; parallel printer interface, and bundled software, all for $3495. The bundled software includes MS-DOS 2.11, GWBasic, Wordstar 3.3, and CalcStar 1.46a.

The unit weighs 17.5 Kg (38.5 lbs.) and would more accurately be described as transportable than portable. It has a plastic case (to save weight), and the keyboard clips into the bottom of the unit. (The keyboard came undone and fell off a couple of times while being carried. This can be a real problem because the keyboard also protects the screen from damage while in transport). The case has handy little legs on the bottom so that the screen can be tilted up towards the user. The keyboard has a nice feel to it, and is laid out exactly like the IBM keyboard, except for the addition of an extra "enter" key to the right of the number pad. The keyboard also has little legs you can flip out to adjust the angle. The carrying handle seems a little on the weak side, and I don't put a lot of long term confidence in it. The backside of the computer has three doors that cover the power cord, the printer connection and any other circuit boards you put in, and the connections for an external monitor (RGB or Composite). The doors open with a "click" mechanism that too often opened spontaneously in the trunk of my car.

Internally, the computer has two main boards rather than one to make better use of space. The user has to set the usual DIP switches to tell the computer things about itself, but you don't have to tell it how much memory it has because it can figure that out itself. There are only 2 expansion slots, but this is probable enough when you consider that the monitor, disk drive and printer are already taken care of. You could add a full-length multi-function card with serial, game, clock and memory, and still have another slot left.

The chip speed of 8 MHz certainly is a treat, programs like WordStar, Lotus 123, etc. just fly! It can become a real challenge to land the plane in Microsoft's Flight Simulator, though! My Frogger game is nearly impossible to play. This fast timing can also become a problem to certain software that use timing dependent routines (such as some copy protected software).

The built-in color card is different enough from the IBM standard that some of my games were unusual, giving occasional streaks of white or coloured lines on the screen, but compatible enough to run Lotus 123 and Microsoft Flight Simulator right out of the box! Some wouldn't run at all. When I tried to load a graphics picture file created on an IBM under Basic, it gave me a screen full of lines that did not resemble the original at all. At first, I thought it could be the fault of GWBasic, but using GWBasic on the IBM produced the correct result. The reason must lie in Sanyo's hardware.

The built-in drives are IBM compatible unless the program makes direct calls to the hardware, in which case the whole machine is likely to lock-up. Some of my utility programs refused to run, forcing me to turn off the machine and try again.

The built-in colour monitor is quite nice. Resolution seems good, and Sanyo has used their own set of text fonts that just seem fancier than the IBM's.

The memory on the main board had no parity bit, but the spaces for the parity chips are there. Any memory additions will have to use the best chips available (150 nanoseconds or better), due to the faster clock speed. Also, some multi-function cards don't seem to work. The technician at Computer Shop told me that the only cards that they had success with were the AST (revision g or better) and the Quadboard (revision 7 or better). That takes some of the wind out of their sails in claiming that "IBM cards can be used".

A good explanation of the criteria that is used by the FBMB. Provides operators with a basis to evaluate other accounting programs.

ACCOUNTING PROGRAM EVALUATION CRITERIA

As promised in last month's Compu-Farm, here's the set of evaluation criteria which we use when comparing different accounting programs. Please note that these criteria are used in conjunction with the general criteria provided last month.

CRITERIA SPECIFICALLY FOR ACCOUNTING SYSTEMS:

Account implementation and maintenance:
Is it a single or double entry system?
Are there provisions for cash and/or accrual accounting?
How are names and numbers for the chart of accounts defined?
Can accounts be added at any time?

Entering documents to journal/posting to ledger:
Are entries posted directly to the general ledger or is a journal used?
What posting operations are required?

Period end record closing and reports:

The balance sheet:
When is it available?
Are assets listed on a cost basis or at market value?

The income statement:
When is it available?
Is it prepared on a cash or accrual basis?

Tax planning and reporting:
How often are tax planing worksheets available?
Does the program perform asset recordkeeping and CCA calculations?
Are any other tax related reports provided?

OTHER CRITERIA:

Audit trail maintenance:
Are transaction listings sorted in account sequence available?
What other sorted transaction listings are available?
How long are transaction details held?
What error correction methods are provided?

Accounts payable and receivable:
Does the program provide cheque writing ability?
Is a vendor file with addresses available?

Inventory maintenance:
Is there provision in the general ledger for other quantities beside dollars?
What coordination between ledger and inventory is provided?

Management report/enterprise analysis facilities:
Are highlights comparable over several years?
Can fixed and variable costs be separated?
Are liquidity, solvency, and performance ratios available?
What enterprise return and efficiency measures are available?
How is financial strength and risk bearing ability measured?

EXPLANATION OF ACCOUNTING CRITERIA:

There are many different ways of implementing a farm accounting system, and the suitableness of a specific approach can only be determined by how well it meets the individual users needs. All accounting programs can be classified according to whether they use a single or double entry system. (In some cases a "modified double entry" system is claimed which combines the features of both types of systems.) The ability of the program to handle accrual accounting will vary, though in most cases the difference between a cash or accrual basis is more a factor of how the accounts are maintained rather than any specific program feature. The methods used to identify, group, and maintain the accounts are very important, and vary greatly from one program to another in ease of use and flexibility.

There are two basic methods used by accounting programs for entering transactions. In the method most like manual accounting, transactions are entered into a synoptic journal in chronological order. There they remain until a posting is completed, at which time the appropriate account balances are adjusted. Whether or not the journal is cleared at this time varies from program to program.

With the other method commonly used, the transactions are entered directly into the appropriate ledger account, no journal is used. Which method used depends upon the needs of the program user.
Virtually all accounting programs generate a balance sheet and an income statement, or an equivalent of both. The ability of a program to produce a balance sheet on either a cost basis or market value basis will depend on how well the program handles depreciation of assets. Being able to produce a cash income statement from a set of accounts maintained on an accrual basis is useful when a farmer would like to

file his income tax on a cash basis, but would like to keep his books on an accrual basis. (The opposite operation, preparing an accrual income statement from a set of cash accounts is impossible without additional information besides what is in the accounts.)

There is some debate over the advisability of preparing tax reports using a computerized system. The opinion of many is that an on-farm accounting system should only be used to maintain records and to produce the standard financial statements and that tax reporting and planning be left to an accountant or other expert. For those individuals who do prepare their own tax returns a system which handles the specialized recordkeeping and calculations involved in basic income tax reporting would be useful.

The maintenance of a good audit trail is particularly important when using a computerized accounting system. Unlike a manual system, most of a computerized system's records are "invisible" to the operator; as a result the various reports generated by the system, and the original documents entered into the system, are the only records available with which to locate and correct errors. The length of time for which the transaction "details" (i.e. the date, description, and amount of a transaction) are held varies greatly from system to system. A complete set of entries for the year, which can be accessed and resorted by the computer, is a great asset if an error is later detected and has to be corrected.

Some accounting packages allow for accounts payable and receivable. A cheque writing facility and the ability to maintain files of vendor and customer addresses will assist operations which write a large number of cheques.

The greatest variation in the facilities provided by the various programs comes in the areas of inventory maintenance and management reporting. Since there is such a variance, the criteria lists the facilities which would be helpful to have, though no program will provide all of them.

VOLUME VI, NO. 3, MAY, 1985

THE MANAGEMENT TECHNOLOGY UNIT

Since we talk to many of you on the telephone, we thought you might like to see who we are. From left to right: Beth Lausen, Bruce Waldie, Mark Olson, Paul Gervais. So now you know!

ON GETTING THE JOB DONE

We have been very cognizant lately of appearing to be IBM oriented. It isn't that we purposefully pick just IBM type software and hardware to review; it just seems to be that the majority of products that are offered to us are products designed to run on the IBM PC or compatibles. Maybe this is a reflection on the state of the market. While the IBM "standard" is the majority of what we currently find around us in our offices, we certainly don't wish to appear like we think that IBM is all there is in the world. Each of us in the Management Tech unit have had a varied background, and certainly when we started into this computer business, it wasn't on IBM's. In fact, two of us don't even own IBM's but have compatibles instead. We also have: Radio Shack Model II, III, and a Commodore Pet in our Branch, and have access to Commodore 64, Apple II+, Apple III. What is important to us is that the job gets done. Hardware comes second. In agriculture, there are a vast variety of machines in use that seem to get the job done, and we intend to continue supporting and helping where we can. (Besides, I am just dying to try out MacPaint).

HARDWARE REVIEW - SANYO MBC-775 (CONTINUED)

As mentioned last month, the Sanyo comes bundled with MS-DOS 2.11, Wordstar 3.3, and CalcStar 1.46a. Often, bundled software is of little consequence, but that is simply not so in the case of this Sanyo.

WordStar has always been one of my favorites, (this review is being written on the Sanyo with WordStar version 3.3). WordStar is the biggest selling word processing software and being bundled with machines certainly helps. It is quite powerful but has been criticized for being hard to learn and having positively weird command sequences. It suffers from slow screen updates, and sometimes needs to wait for the program to catch up. On the Sanyo 775, however, there is no waiting, due to the fast clock speed. The fast response to commands did cause an unexpected problem though: commands are given to WordStar through the use of "control sequences". For example, the command to go the end of a line is ^QD (where ^ represents the control key). Normally, Wordstar waits about one second after you press the ^Q, and if you haven't pressed any other key, it assumes you need help and a help screen appears. If you do press the second key within one second, it figures that you don't need help and just continues with the command. In the Sanyo, however, it only takes .5 seconds, so you can't be fast enough and you get the help screen every time. This slows down operation by a fair bit.

CalcStar is like a whole group of other spreadsheets. It has the normal formula functions (sum, count, average, etc.) and can even do a linear regression! It is powerful, but not as easy to use as Lotus 123. We didn't get the chance to use it very much, but it is generally regarded as an OK spreadsheet.

The manuals are not bad if you can forgive the occasional lapse into a "This manual is not explained Spellstar..." type of English. There is one combined manual for WordStar and CalcStar, and a manual for the machine and MS-DOS and GWBasic. (Does anyone know why it is called GWBasic? Our bet is that it stands for Gee Wiz Basic.) There is not very much technical information for the curious (nosey), so if you are trying anything out of the ordinary, you will likely have to depend on the store you bought it from for support.

We encountered just such a situation when we tried to add memory to get up to 640k. The first card we tried (a third party 512k board) did not work, and the computer only recognized the original 256k that it came with. We next did what any normal person would do and looked in the instructions. We couldn't find any information on adding memory in the manuals, so phoned The Computer Shop in Calgary. Once I got through to the technician, he answered my questions capably but did not seem too thrilled with the idea of someone he didn't know poking around inside "his" machine. Since, in a sense, this was "his" machine, I accepted his reservations and believe he would be very helpful to a legitimate client.

Overall, I found that I liked this machine. The speed certainly is a treat, and compatibility should not be too much of a problem if you don't make use of programs that expect certain things from the disk controller card or of the graphics card. Its suggested price is $3495, and The Computer Shop has an introductory price of $3195. Since it includes two good pieces of software, as well as the operating system, it is, in my opinion, a good value.

Special thanks to Karen Morrison of the Computer Shop, 3515 - 18 Street S.W., Calgary, for the loan of the machine.

VOLUME VI, NO. 4, JUNE, 1985

A good reminder for consumers.

CAVEAT EMPTOR!!! (BUYER BEWARE)

It has been brought to our attention that certain unscrupulous individuals have been selling franchises for computer ag-software packages. It seems the software package consists of some commercial software plus some public domain software including our very own ADA software, which you can get for free. The whole point of this is people who plunk down their money to get into this deal, end up paying a lot of money for free public domain software.

We have also heard of deals where individuals buy hardware and software packages, only to find that the software has been completely "pirated" right down to the photo-copied manuals. Don't get caught in this scam! Smart consumer buying always dictates - check out the deal BEFORE you part with your money!

A good reminder of what is available from your district agriculture office.

HERBICIDE RECOMMENDATION PROGRAM

After a few years of hard development work, Alberta Agriculture's Herbicide Recommendation program is now available to producers through the department's regional offices. The following is a news release:

On May 1, 1985, the Herbicide Recommendation Program became operational in Alberta Agriculture's regional offices at Barrhead, Vermilion, Airdrie, Lethbridge, Red Deer and Fairview and at the district office at Westlock.

According to Walter Yarish, head of Alberta Agriculture's weed control sector, the computer assisted program is designed to assist producers in selecting the most appropriate herbicide for the weed spectrum in their particular crop. It also makes cost comparisons, performs metric conversions and calculates the quantity of herbicide that should be added to the spray tank.

Here's how it works: Farmers give the type of weed problem they have and the stage of the crop. A computer search yields all potential herbicides registered for this purpose and their relative degrees of control and crop tolerance. To make cost comparisons, the rate used, the acreage (acres or hectares) and the cost of herbicide are entered. Once the individual has the degree of control, the crop tolerance and the relative cost, he chooses the product that best suits his needs. He can then calculate the quantity of product and water to be added to his spray tank to obtain a certain rate of output.

"After the sprayer is properly calibrated, and the right proportion of water and herbicide added to the spray tank, the only thing left to the operator is spending the long hours on the tractor," says Mr. Yarish.

Although the equipment and communication lines to access the program will only be available in regional Alberta Agriculture offices this year, expansion to district offices is anticipated in the future.

Contact Walter Yarish at 427-5329 fo more information.

DAIRYINC.VC AND DAIRYINC.WKS RELEASED

The Farm Business Management Branch (FBMB) has released a dairy income estimate template for Lotus 123 and Visicalc. The following is an excerpt from the program documentation:

Given the following six major variables describing a specific individual situation, this program calculates an ESTIMATION of income for a dairy year (August 1 through July 31). It also determines how much market share quota or fluid quota that producers need if they are in an over-production situation.

1 - number of cows
2 - milk delivered/cow/year
3 - average butterfat content
4 - fluid quota
5 - industrial quota (MSQ)
6 - utilization factor (% of fluid milk used for Class I)

Standard variables, common across the province, such as subsidies, levies and process also need to be entered. As well, further variables specific to certain milk plants (e.g. freight rates, yard charges) or voluntary farmer deductions (such as producer association fees) are also required.

The program can be used to help individual dairy producers estimate their total milk income, based on various combinations of production factors (total milk delivered and the per cent in butterfat level of it), quota factors and market conditions (utilization of fluid milk). It can also be used to estimate what various combinations of quota are necessary for a certain delivery level, and thus what income to expect from each quota combination.

This program is provided as a spreadsheet template for Lotus 123 and Visicalc in Apple II series and IBM PC disk formats. It is available as part of a collection of farm management templates and programs for the Farm Business Management Branch in Olds. Contact Gerd Andres of the FBMB at 556-4247 for more information.

CALL FOR USER GROUPS!

For the computer beginner or expert, one of the best sources of computer information is a computer users group. A users group is individuals interested in sharing knowledge. It may be a group who use the same type of computer or are interested in ag-computing.

These people get together once a month or so, to discuss group activities and new products, and to hold question-answer sessions. For example, a member may be having trouble getting a software package to run properly with his modem. Another member may have the solution to this problem. The whole idea is to share experiences for the benefit of the users. As well, a member of the group may present a demonstration of a new software or hardware product that he or she has recently developed or acquired.

An additional benefit is the group software library - a collection of public domain or "shareware" of which copies are available at cost to group members. Some of the best communications and word processing software that we've seen came from users group software libraries.

Several computer users groups exist across Canada and the U.S.A. Compu-Farm wants to provide a list of these groups. If you belong to such a group or would like to start a group in your area, please call us. We would like to hear from you!

NEW COMPUTERS FROM COMMODORE...

Two new computers have been announced by Commodore Business Machines International. According to Commodore, the C128 is fully compatible with the C64 and works under three "modes". One mode, the C64 mode, lets the machine run all existing C64 software. A second mode is called the 128k ram mode (expandable to 512k), running BASIC 7. The machine also has a Z80A processor to allow a third mode which lets you run CP/M 3.0 programs. The computer can use a 1541 drive from a C64, but Commodore has promised a new 1571 drive. Look for it to be available in July. Price - around the $500-$600 mark.

The other computer announced by Commodore is the PC10. As its name suggests, this is Commodore's first plunge into the IBM PC compatible market. We had an opportunity to take a quick look at this machine. Here's what we saw.

From the outside, this computer is similar in appearance to IBM's PC/AT. That is a main box, off-white in color with one or two off-white stacked half-height disk drives on the right side of the box and two little LED's on the left. The main unit contains the CPU, memory, I/O and expansion bus.

Attached by plug-in cords are the IBM PC style, 85-key keyboard and your choice of either a monochrome (hi-res green) or color monitor. If IBM's keyboard makes you flinch, then relax. The PC10's keyboard is an improvement over IBM's, with bigger ENTER, SHIFT, INSERT, TAB and ESC keys, illuminated CAPS and NUM LOCK keys plus and extra ENTER key on the keypad. The BREAK key is next to the BACKSPACE key (not a good idea) and I'm not keen on the placement of the ALT and PRTSC keys. But on the whole, this is an OK keyboard, although it felt a little mushy compared to the PC's.

The unit comes with 256k RAM (expandable to 640k), a standard parallel printer port and RS232C port. You can choose either a mono or color video controller card to plug into one of the five available expansion slots (which accommodate full-size 13.25 inch expansion cards). The disk drive controller is built into the motherboard and can handle up to four floppy drives.

One aspect of the PC10 which makes it different from most other ho-hum PC compatibles on the market is the main motherboard which is actually two computer boards which plug together, side by side. One side contains the I/O bus (serial, parallel ports, slots, keyboard port and so on) while the other side contains the actual computer (CPU, RAM, ROM and so forth). The whole thing is set up so that the CPU board simply slides out... which makes adding memory or servicing the board easy. There is also an internal bracket on which the floppy drives are perched, with spare room for an internal hard disk.

The PC10 ran all the software we had with us at the time, including the regulars like Volkswriter, Lotus 123 and our ADA BASIC programs (under Commodore's PC MS-DOS version 2.11 GWBASIC). Since the machine had a monochrome monitor attached, we couldn't try any of our tricky color graphics packages.

This is an interesting machine from Commodore priced (dependent on options) in the $3000 range. We hope to have a closer look at both the C128 and the PC10 in the near future.

HARDWARE REVIEW - DIGITAL PAINTBRUSH SYSTEM

One of the really neat things about working at the F.B.M.B. is the toys that we occasionally get to horse around with! This review is about a graphics-drawing system that works on an IBM PC, Apple II, or compatibles. It consists of some excellent software and an input device that attaches to a game port. The input device is about 8" by 12" and has a "pen" that is attached to it by two dacron strings. When you move the pen tracing a picture, for example, the system can sense where the pen tip is at any time. Now, the only artistic thing I can do is trace things. Most of the current crop of graphics-growing systems allow you to use the cursor control keys (slow and imprecise), or a mouse (usually expensive, and not exceptionally precise). This system shines because it uses a pen, which is something that feels natural to grasp and draw with. The software includes a good graphic design program that lets you do the usual: lines, curves, circles, boxes, 3-D boxes, painting, load pictures from libraries, etc. It also includes a measurement/estimate program that will use an aerial photo to estimate how many acres is in that slough behind the barn. As well it has programs that let you do all kinds of charts and graphs. Not all farmers will have a use for this system, but it sure is fun. Approximate price is $700 for the IBM version. Thanks to Ascot Engineering Inc., #3, 9837-44 Ave, Edmonton, 438-0994 for the enjoyable weekend!

VOLUME VI, NO. 5, JULY, 1985

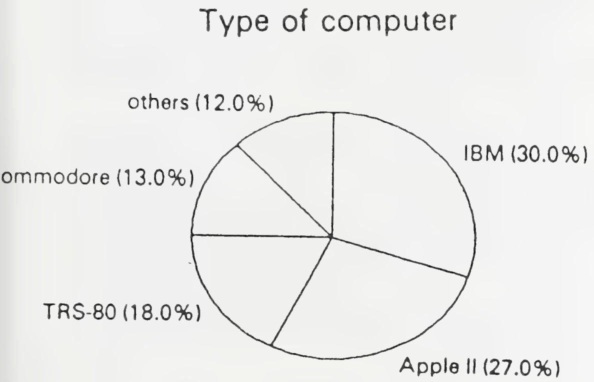
RESULTS OF THE COMPU-FARM MICROCOMPUTER ACCOUNTING SOFTWARE QUESTIONNAIRE

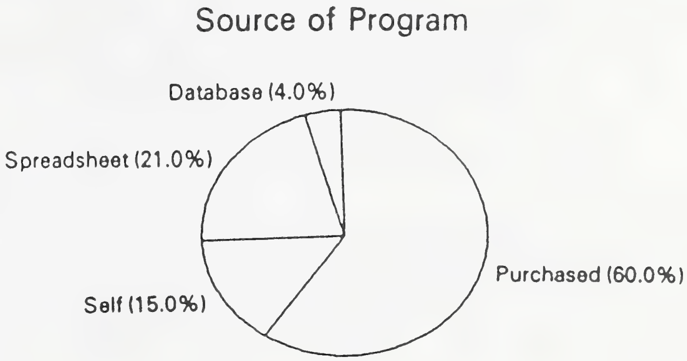
In February of this year a survey was sent to Compu-Farm subscribers who had indicated that they used their computers for accounting. Of approximately 2200 subscribers, 684 received the questionnaire and 355 of those who received the questionnaire replied to the Farm Business Management Branch. We would like to thank those readers who responded to the survey, and this month's Compu-Farm is devoted to highlighting the results.

The first part of the survey asked what kind of hardware the respondents were using. The leader for actual type of computer was the IBM PC and compatibles with 30% of all respondents, followed by the Apple II or compatibles at 27%, TRS-80 I, III, IV at 18%, Commodore at 13%, and other computers at 10%. In our experience this is the first survey which has shown the IBM PC to be in the lead. This situation may change in the near future, since accounting programs are just now becoming available for the Apple MacIntosh.

As far as other hardware used, the typical computer had two disk drives, up to 128k of memory and an 80 column printer. Given the one third share of the market that the IBM standard has attained, it is a little surprising to see that two thirds of the computers have 128k or less of memory, especially when the standard IBM now has 256k. Twenty of the machines (9%) which had 128k or less of memory were the older 64k motherboard IBM PC's.

At first we were surprised to see that 1% used some form of storage other than cassettes, one or two disk drives, or a hard disk, because we couldn't really see what "other" there could be. Could it be paper tape or punch cards? Actually all of the "other" respondents simply had more than two floppy disk drives. Very few respondents (less that 18%) used different storage devices other than dual floppies, and every respondent used a printer of some sort, with narrow (80 column) printers outnumbering wide printers by a factor of two to one.





For the purposes of our survey, we broke down the accounting packages used into four broad categories; self written programs, purchased accounting systems which run on a spreadsheet, purchased systems which require a database manager to run, and purchased stand alone programs. Not surprisingly, considering the amount of time and effort required to write one's own software, purchased stand alone programs led with 60%. However, it is still significant that 14% of all respondents said that they wrote their own accounting program. After reading the comments, many of those who said they used a spreadsheet or database manager for their accounting system (20% and 3% of respondents, respectively) they would also qualify as having written their own accounting systems. The significant fact that somewhere between 20% and 30% of the Compu-Farm readers using computers for accounting have written their own software will influence how we serve farm computer users.

Of those who said they wrote their own accounting programs, 60% used the BASIC language, 34% used a spreadsheet and the remainder used some other language. When asked how long it took to develop their system, one respondent answered "five days to develop and two years to debug". Anyone who has ever tried to develop a software package can sympathize with this. Thirty percent of those who had written their own programs have considered selling it, the average price put on a user written program was $790.00. A "personal interest in programming" was the most common reason cited for writing one's own accounting system.

Many different spreadsheet programs were used by those who did their bookkeeping. VisiCalc and Lotus 123 accounted for one half of the respondents.

A full 60% of respondents had purchased programs from commercial sources. Statistics in this area can be hard to use on a comparison basis because programs can be machine specific. There were 9 programs that had 3% of the users or more. BPI came out on top with 13%. BPI is available on IBM, Apple II, and Commodore, so it is easy to see how it could have so many users. Close in its footsteps were Countryside Data and Settler with 9% each. Next were Homestead, Red Wing, Digipac, Radio Shack, Peachtree, and Continental Software.

Within computer types BPI was still on top with the Apple group, Homestead for the IBM's, Digipac for the Commodores, and Settler and Radio Shack tied for the TRS-80's.

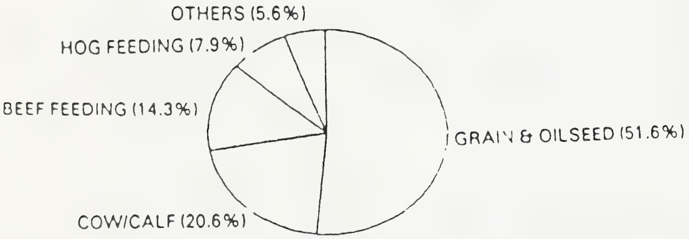
It is important to remember that just because programs have a large user base, they do not necessarily have to be the best. Programs that have been on the market for a long time have a better chance of having more users. New programs take a while to build up a user base, but over time, people will change if the program is not doing the job.

Our 227 purchasers spent a total of $167,415 for an average of $737 per package.

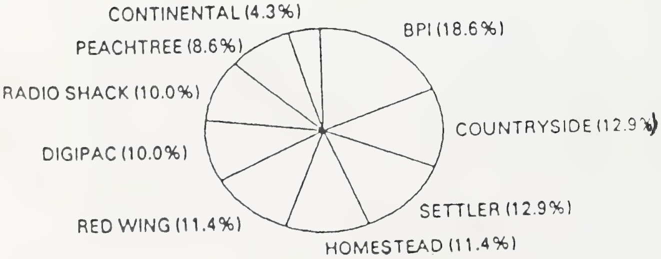
Part of the survey also included questions about the program dealers. The best performances were turned in by dealers who were also the manufacturers of the programs. For example, out of a best possible score of 3.0, two companies turned in scores 2.6. The worst performances were turned in by straight retail stores. One person even reported that a grocery store check out clerk would have been more helpful than their dealer.

Of all the people that responded to our survey, 65% were involved in grain and oilseed farming, 26% in cow/calf operations, 18% in beef feeding, 10% in hog feeding, with all other categories being less than 8% of the total sample. Of all the accounting systems used by the survey respondents, 72% maintained their accounts on a cash basis and 70% used double entry.

TYPE OF OPERATION



PROGRAM USERS



The survey respondents had a surprisingly wide range of features with their accounting packages. Eighty-five percent of the systems used a general ledger, 43% and 37% respectively used accounts payable and receivable, 31% used inventory management software, and 28% had tax planning/preparation systems. The accounts payable and receivable statistics are particularly surprising since the general wisdom is that most farmers don't have need of this capability.

Almost every person used more than 30 ledger accounts with the average being about 60 accounts. The average respondent processed approximately 700 transactions in a year.

We are pleased that 70% of respondents said they did not have difficulty setting up their chart of accounts. Forty-five percent of the systems surveyed do budgeting, and only 31% do cash flow calculations.

Nineteen percent of all respondents rated the manual that came with their program as excellent, 52% rated it adequate, 12% rated it poor, and 5% said that no manual came with their program. Of the programs surveyed, 43% were copy protected in some way.

Twenty-seven percent of the survey respondents had used a previous accounting program but changed for various reasons. Thirty-eight percent changed because of the need for more features. For example, "inadequate reports", "needed double entry", "not enough detail", "weak manual", "not suited to farm", etc. Nine percent had changed because they had demos or "borrowed" copies; 11% had changed because the system was too hard to set up and use. Another 9% changed because they switched computers, while 5% said that the previous program had enough "bugs" to prevent continued use.

When asked what accounting method they had used before they set up a computerized system, 44% said they had used simple single entry systems, 30% had used a full double entry accounting system, 9% had used Canfarm, 4% of the total had used no previous accounting system.

We were interested in where information was obtained that led to the purchase decision. Over 65% used the recommendations of friends, other users, courses, seminars or talks. Twenty-six percent used Compu-Farm, other Farm Business Management Branch and Alberta Agriculture publications or had consulted directly with Alberta Agriculture. However, taken as individual categories, the major influence in the purchase decision by far was the recommendations and experiences of other computer users at 38%. It is interesting to note that more than one accounting package in three is bought on the recommendation of a previous user.

CONCLUSION

To wrap up, we would like to point out some of the survey results which we found to be particularly interesting.

It is remarkable that IBM compatible computers now make up 30% of the systems used for accounting considering that both Apple and the TRS-80 line had about a three year head start. However, the situation is far from gloomy for non-IBM owners, since few software developers can afford to alienate two thirds of the market by only providing an IBM version of their product. On the other hand, because any new accounting products developed must be adaptable to a wide range of machines, they will necessarily be somewhat limited in their innovation.

Most people will agree that if this survey is representative, the number of people involved in writing their own software is remarkably high. There is a tendency in the farm computer business to underestimate the ability of farmers to learn and adapt to new computer technology, a surprising error when one looks at the amount of new technology which farmers have learned in other areas in recent years. It is important that software developers are aware of the skill level and learning abilities of their potential customers if they are going to produce successful products.

Finally, it is worthwhile to note that nearly one in three respondents to the survey have already switched accounting programs at least once. This underlines the importance of carefully selecting your software purchase.

Copies of this questionnaire with complete statistics are available upon request.

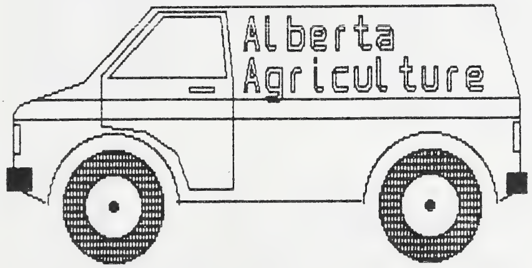
VOLUME VI, NO. 6, AUGUST, 1985

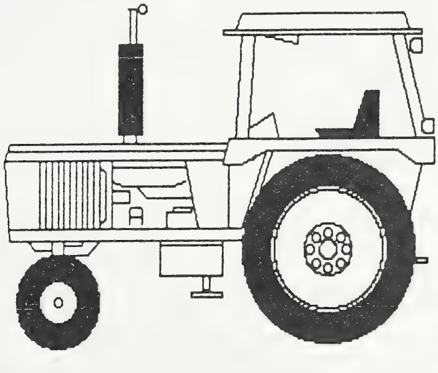
MOBILE COMPUTER VANS

In April we announced that IBM is donating 20 IBM Portable computers to Alberta Agriculture, to be used to provide computer training and instruction to rural communities. This donation is part of a larger donation to the University of Alberta, under a cooperative project in educational computing. Alberta Agriculture will be putting these computers into two vans, which will then travel around the province. There will be one instructor per van giving introductory courses on computers for farm use. The computers will be moved from the van into classrooms or community halls.

Classes will be scheduled through Engineering and Rural Services's **Skills Training Program**, commencing November 1, 1985. The two instructors will travel independently, and they will each be giving a two day course, twice a week. For the first winter, these courses will be oriented to beginners and the course offering will be "Introduction to Computers for Farm Use". Topics to be covered include:
"Acquiring fundamental computer skills"
"Introduction to spreadsheets"
"Computerized record keeping systems"
"Other computer uses and how to make purchasing decisions"

These topics are guides only, and may vary from area to area depending on the experience and interests of the participants. The courses are not meant to train the participants in any specific skills, but are meant more as a "tour" through the land of computers. For more information, contact your nearest District Agriculturist.





VOLUME VI, NO. 7, SEPTEMBER, 1985

NAPLPS SOFTWARE FOR THE MACINTOSH

Electrohome Ltd., of Kitchener, Ontario has released a Videotex decoder for the Apple MacIntosh, allowing owners of this microcomputer to connect with information services such as Grassroots. While we have not had a chance to use it yet, the documentation says that all NAPLPS communications modes are supported to enable full interaction with the remote database. In addition, any received data can be captured and stored on disk, for display at a later time. Suggested retail price is $135 plus $5 handling from Electrohome Ltd., 809 Wellington Street North, Kitchener, Ontario, Canada N2G 4J6.

THE FBMB REMOTE BULLETIN BOARD SYSTEM

Our Remote Bulletin Board System (RBBS) has been running now for a little over a year and it's been an interesting time for us. We have had over 500 calls from all over Canada and even some from the U.S.

Currently, we have under 100 files in our file transfer list, ranging from back issues of Compu-Farm to business programs like the Finance Manager and various agricultural templates for VisiCalc, SuperCalc and Lotus 123. Although this doesn't sound like very many files, remember that the FBMB RBBS is a specialized agricultural bulletin board. It is our philosophy to provide an environment where agricultural computer users can upload and download software which is useful to them. As well, it is a meeting place where interested individuals can exchange messages on the RBBS's message system.

Some of you have asked why there aren't more general purpose software or utilities on our board. While we are certainly pleased to add such software to our collection on the board, there are many general-purpose RBBS's run by users groups and other computer-literate individuals. These RBBS's provide an excellent source of computer software for the general computer user. Consequently, our main intention is not to duplicate what these RBBS's do so well, but to focus on our area of expertise - agricultural software.

If you are looking for software other than what our RBBS offers, we maintain a list of Canadian bulletin boards on our RBBS. To obtain this list from our bulletin board, simply sign on, and enter B, RETURN, followed by O, RETURN, when the board prompts you for input. If you don't have a modem, or your phone budget is used up for the month, drop us a note in the mail and we would be happy to mail you the list.

Our RBBS telephone number is (403) 556-4104, as listed at the top right hand corner of the Compu-Farm newsletter. Our RBBS parameters are: 1200 bps, no parity, 8 data bits, 1 stop bit.

A reminder that price is not always the determining factor. More items to be added to the consumer checklist.

A reminder that price is not always the determining factor. More items to be added to the consumer checklist.

INEXPENSIVE SOFTWARE

As we noted last month, lately there seems to be a flood of cheaper software on the market. Companies such as Adam Osborne's Paperback Software and others, are releasing Lotus 123 work-a-likes for less than $100 US. Borland International has released Superkey for the IBM at a price considerably less than what RoseSoft has been asking for their ProKey. Borland even created somewhat of a sensation when it released Turbo Pascal at an original price of $49 US. The next closest competition in the market costs well over 5 times as much. There is no doubt that changes in the marketplace are happening.

There are several things to take into consideration before buying packages such as these. Support costs money. Dac Software is not giving any support to users who purchase their Cad Easy program. Some complicated packages are next to worthless without support. Does the low-cost general package do everything that the full featured package does? Turbo Pascal, for example, has some limitations that other Pascals do not. Dac Easy has some modules, such as Purchase Order and Billing, that most farmers would have absolutely no use for.

The results of our survey have told us one thing, however. One third of the respondents had already changed accounting programs at least once. It may well be, that it is worthwhile buying a low cost package just to get your feet wet. Once you have defined your needs, go out and buy that full featured package.

HARDWARE REVIEW - OLIVETTI M24 PERSONAL COMPUTER

We recently had a chance to work with the new Olivetti M24 Personal computer, an IBM-PC compatible, for a week. The machine we worked with was a dealer demo and was equipped with two floppy disk drives, 384k of memory, a Citizen MSP-10 printer, and a 30 Megabyte external hard disk manufactured by Altel Data.

The computer itself is different from most IBM standard computers because it uses a true 16 bit 8086 processor, rather than the more common 8088. The difference between these processors is that the 8086 can transfer data between the processor and its memory 16 bits at a time, while the 8088 can transfer data only 8 bits at a time. As well, the 8086 in the Olivetti ran at a clock speed of 8 MHz, while the PC runs at 4.47 MHz. In jobs which required use of the disk drives or printer there was much less advantage. In fact, the Olivetti's disk drives were actually slower than those on an IBM.

The base Olivetti M24 comes with 256k memory, two 360k disk drives, a green or amber text and graphics display, one each serial and parallel ports, and a built in clock/calendar with battery backup.

The display is worth special comment. It appears to be some sort of hybrid which provides the high quality of the monochrome display when used in text mode but is still compatible with the IBM color/graphics card when displaying graphics. The display was very easy to read and use, except that it was nearly impossible to distinguish between high and low intensity characters.

Even though the Olivetti comes standard with only one expansion slot, in most cases a "Bus Converter Board" will be installed which increase the number of slots available to seven. All seven expansion slots will accept IBM standard cards of any length. However, if you want to gain the speed advantage of the 16 bit addressing capability of the 8086 you will have to use the Olivetti memory expansion and video boards, which take advantage of a special connector provided for four of the expansion slots.

The computer seems to be IBM compatible. In our testing we could find no programs which it could not run, with the exception of the BASIC interpreter provided with PC-DOS. However a replacement interpreter called GWBasic is included with the MS-DOS operating system provided with the Olivetti. Since we could find no way to slow down the higher processing speed, some programs had timing difficulties.

The computer we had was equipped with the standard Olivetti keyboard. The feel was quite soft compared to other keyboards, but everyone who tried it found it comfortable to use. The keyboard was laid out exactly like an IBM-PC keyboard, except that indicator lights were provided for the Caps lock and Num lock keys. Also available is an "Olivetti Extended Keyboard" which provides an additional 8 function keys, a separate numeric keypad and a few other additional keys, but since its layout is very different from the standard IBM keyboard, it may cause some software compatibility problems.

The Citizen printer supplied is a good example of the new generation of dot-matrix printers becoming available. The printer could be made compatible with either the popular Epson line of printers or with the IBM Graphics printer, depending on the setting of an internal switch. The printer was rated at 160 characters per second, handled eight inch wide paper in either tractor feed or sheet feed format. As well, pressing the line feed and on-line switches together put the printer into near letter quality mode. In this mode, the printer produced excellent type which was hard to distinguish from typewritten output, but not without a very substantial reduction in printing speed.

While the printer had very powerful printing capabilities, it could be improved in the structural area. The knobs, levers, switches and covers of the printer were light and flimsy, so that you were constantly worried about breaking them. The printer was provided with three light plastic covers, two of which sat lightly on top of the printer, ready to fall off at the slightest touch. The third snapped in so tight that you feared breaking it every time you had to open it (which was often, since it covered the print head, ribbon, and paper ball). To gain access to the configuration DIP switches, four screws and the entire cover of the printer had to be removed.

There is little to be said about the Altel Data hard drive. During our testing, it performed without any problems and seemed to be very fast. One must question the wisdom, however, of buying a large (30 megabyte) hard disk without some sort of backup system since it would require over 80 floppy disks to back it up.

We would like to thank the Computer Post in Red Deer for loaning us their system for evaluation.Revised in 1988.

VOLUME VI, NO. 8, OCTOBER, 1985

AGRICULTURAL SOFTWARE DIRECTORY 1985

Locating and selecting the right agricultural software for on-farm or institutional use continues to be a difficult and occasionally frustrating task. To assist users in finding software, Debbie Meding, research assistant for the Farm Business Management Branch, has compiled a list of agricultural software available from software manufacturers in Alberta, across Canada, and the U.S.

The publication currently lists over 550 different software products, sorted by category (Financial Record Keeping, Marketing, etc.), product name and manufacturer. It lists computer hardware requirements and gives a brief description of what the software does. The agricultural software industry is in a constant state of change; consequently, the data contained in the publication is subject to change. The information has been compiled over the last year and is now maintained by a specialized database program so that revisions and additions can be made very easily.

Copies of the publication can be ordered from the Farm Business Management Branch, Box 2000, Olds, AB, T0M 1P0. Any software manufacturer who wishes to be included in the next directory (and we are sure there will be many) can contact the F.B.M.B. at (403) 556-4240.

NEW TECHNOLOGIES - THE AMIGA BY COMMODORE

Something new has come onto the market lately, and you are about to be deluged with a lot of advertising. Commodore, the same people that brought you the PET, the PC10, the PC20, the C64, the Commodore PC128, etc., have now delivered the AMIGA. We recently had the opportunity to see a video tape of the introduction ceremonies and even had the chance to try one out for a few hours. While we did not really get a chance to do a whole bunch with it due to a paucity of software (typical of any new computer), we are nonetheless impressed. Part of this can be attributed to our own interest in electronic technology and the step forward that we see the AMIGA representing. We also, however, have to temper this with doubt about where the market place will let this machine go. What follows will describe why we think this machine will attract a large following, what the pitfalls may be to those who do agricultural computing, and what is needed next to make it truly valuable to agriculture in general.

FIRST - THINGS THAT ARE NOT NEW:

The basis of the AMIGA is the same Motorola 68000 CPU chip that is used in the Apple MacIntosh, running at a speed of 7.16 MHz. It uses an operating system (called INTUITION) that uses ICONS, pull-down menus, multiple screens and a mouse. The purpose of all this is to release the user from having to remember commands like - LOAD "*",8 and instead make operating the computer more ... well "Intuitive". This whole concept was pioneered by Xerox in the 1960's with their STAR. (Many users take great joy in calling IBM technology ancient because it uses the 8088 chip, but actually the whole concept of this type of user interface is much older). It comes with one 3.5 inch disk drive that can hold 880k bytes of storage. There is 256k of built-in memory that is expandable internally to 512k and externally to 8 Megabytes. It comes with one standard parallel printer port and one RS-232C serial port.

SECOND - THINGS THAT ARE NEW:

(depending on your point of view). The AMIGA has taken great pains to increase the level of work that the computer does for programmers, so that programmers do not have to do it themselves. Its main features centre around graphics, sound and built-in multi-tasking. It uses some custom-built chips that were especially designed by Amiga. Getting technical here for a minute, it uses things called Interrupts and Coprocessors, rather than Polling and a single processor (which is what the MacIntosh uses). Telephones are an example of Interrupts: you only have to pay attention to the phone when the bell rings, you don't have to keep lifting the receiver every 30 seconds to see if there is someone on the line. Coprocessors can best be described as several heads are better than one, especially if they consist of a mathematician, a graphics artist and a musician. Net effect is that the AMIGA is much faster than either the MacIntosh or the IBM AT.

The AMIGA has an "open architecture". All this means is that Commodore has released technical specifications on the AMIGA to third party manufacturers. It also has an "expansion bus port" which is roughly akin to the slots on an IBM or APPLE II+. Translated this means that you expect lots of third party add-ons. In fact, Tecmar Inc. has already announced a 20 meg hard disk, a tape backup system, expansion cards, modems, etc. In contrast, the MacIntosh upgrade from 128k to 512k involves replacing the entire motherboard at a cost of almost $1000! Adding a hard disk to the MacIntosh involves either going through the serial port (a painfully slow process that eliminates half the reason for adding a hard disk), or actually hacking at the motherboard (a process that until recently voided your warranty and any future support from APPLE.

Another good thing that is built-in right from the beginning is multi-tasking. This simply means that the AMIGA can easily do several things at once. Such as: monitoring the milk production from your herd, posting your accounts, and receiving information from a remote service such as Grassroots, all at the same time.

The AMIGA has taken great care to make sure that it fits into the existing world, as much as possible. In doing this they picked the IBM PC to emulate. They have announced software that will allow the AMIGA to run the 20 most popular IBM programs. Some sources we have read indicate that most IBM programs run at about one half their normal speed when run on the AMIGA.

Slick things that are included with the AMIGA include 4 voice sound, built-in speech syntheses, MIDI (Music Industry Digital Interface), Coppers, Blitters and Sprites! It even includes one of the industry's first standard RGB analog monitors.

SO - WHAT DOES IT MEAN TO ME? - YOU ASK:

All this technology will not make your accounting or physical record keeping program any more exciting to use. Easier, maybe, but not more exciting. It may allow better analysis of data through good graphs; it may help programmers write programs that provide better help when you need it; and it may give you a better excuse to buy a computer for the kids.

The AMIGA is still very new. There are more products announced for it now than there were for the MacIntosh at the same stage of development. Beware, however, because announced products are not released products. It took two years after the MacIntosh's release before there was a true wealth of programs for it. Some announced products were cancelled. We don't think it will take as long for the AMIGA, but then who ever thought interest rates would go above 14%? The key is still to ask yourself: Why do I think I want a computer and will it do what I want right now?

The graphics, animation and sound capabilities of the AMIGA are very exciting, not to mention the raw horsepower. It offers the ability to present a detailed analysis of data through very good graphs, that could even be animated.

A problem though, is that there is no software for farm use yet. An even more important point, for now, is that there is no good way to get those incredible graphs onto paper, other than the usual, already existing printers. Better output devices will have to be developed, to keep up with the capabilities for this computer.

SO - WHAT DOES ALL THIS NEW STUFF COST?

The price is very attractive. The 256k AMIGA with one 3.5 inch drive, keyboard, ABASIC, tutorial, demo, and mouse, is $1995 (that's Canadian bucks too!). The Analog RGB monitor (highly recommended) is $799. An external 3.5 inch disk is $449, and a 5.25 inch (IBM format) is $599.

Special thanks to the Computer Shop, Calgary, for the two hours of fun.

BEEF ROP PROGRAM RELEASED

The Farm Business Management Branch has released a template for Lotus 123 that allows beef producers to calculate their own Record Of Performance indexes. It calculates 205 day, 365 day, and feeder (165 day) indexes using the same techniques and tables used by the Federal R.O.P program. As well, it produces management graphs of the number of calves born per week by each of first-calf heifers, second calf heifers and mature cows. Obvious benefits include the reduction in time it takes to get the results back from the Federal program, and the addition of management analysis. It requires Lotus 123 running on an IBM PC or compatible, and a printer capable of printing 240 columns. A printer capable of 132 columns can be used if the user modifies the program and does not need the 165 day indexes. The amount of memory required varies with the number of calves to index, but a rough guideline is 160k to load the blank template and 1k per animal after that (320k required for 160 calves). The documentation comes on the disk and can be printed out by the producer. The program is available to individuals or groups by sending a blank disk to the F.B.M.B. at Box 2000, Olds, AB, T0M 1P0. For more information call (403) 556 - 4240.

ADA BASIC PROGRAMS ON IBM PC COMPATIBLES

Some people have been phoning in to say that they are having problems getting our ADA BASIC programs to run on their IBM compatibles. To understand why these problems occur, we have to first describe what is different between IBM's and compatibles when it comes to the BASIC interpreter.

When IBM first released the PC, they included a model that did not have disk drives but could be used with a cassette recorder to load and save programs and files. In their wisdom, they decided to include some of the BASIC interpreter in ROM'S on the motherboard, so that people without cassettes could at least still do something with their new computer. This version of BASIC (called Cassette BASIC, oddly enough) allowed the user to load and save programs and data to a cassette and do limited graphics, etc. The addition of disk drives and DOS included two small programs called BASIC and BASICA (for Advanced BASIC), that served as extensions to the BASIC that was already in ROM. The extensions included the ability to load and save files to the disk drives, and in the case of BASICA, allowed for more advanced gaphics.

Trying to load the IBM BASIC or BASICA on a compatible usually ends up with a locked up computer or with the message "Divide by Zero Error" on the screen. This happens because only a small fraction of the interpreter is included on the disk. It also needs the code that is in the ROMS which of course is not there on compatibles.

Compatibles almost never have BASIC in ROM, instead they load the entire interpreter from disk. These machines would be dead in the water without disk drives and DOS, but then that is the way everybody wants it these days. The compatible manufacturers usually include a version of BASIC that has been licensed from Microsoft and is variously called GWBASIC.EXE, BASIC.EXE, BASIC.COM, BASICA.EXE, or even BASICA.COM. Sometimes to load the interpreter, only one program is required, at other times, two are required...........(confused yet?)

The disks that our programs are distributed on include an INSTALL program that makes the disk self-booting. It tries to copy the IBM BASICA.COM interpreter onto the disk. The problems arise when your compatible uses GWBASIC.EXE, or uses two programs to get the interpreter loaded. All we can suggest for now is that you consult your manuals to find out the procedure for loading a program in BASIC.

The Sperry PC is yet another contender in the MS-DOS, IBM-PC compatible market. It is available in several different display and storage configurations, ranging from a one or two floppy drive system to a one floppy, one 10 meg hard drive system. As with most computers of this type, separate disk controller boards are needed for the floppy and hard disks. Sperry display options include a standard green-on-black Sperry monochrome monitor, a low-resolution 16-color monitor or an RGB 256 color monitor. Each of the display options require a different display controller card. As with most compatibles, almost any third-party display option will work with the Sperry, so you can customize the system any way you like.

The latest version of the Sperry has 256k on-board memory, expandable by adding memory boards (older versions had 128k on the main board). The main processor is an 8088, running at 8 MHz. A clock speed of 4.77 MHz (IBM PC speed) can be selected by setting a DIP switch at the rear of the system unit. Internal DIP switches for setting display, memory and disk options are fully documented in the literature that comes with the computer. At the rear is a standard RS-232C serial I/O port for a modem or other serial device. More on this later.

The 512k RAM system we evaluated had Sperry's RGB monitor, one floppy and one hard disk. It was equipped with the 16 color high-resolution Plantronics color graphics display and printer card, two disk controller cards (one each for the hard and floppy disks), a memory expansion card and a Rixon PC212A internal modem card.

At first sight, the Sperry is similar in appearance to an IBM PC desktop computer but with some important differences. The off-white metal cover comes off easily by removing 5 screws. Inside there is 256k RAM memory on the motherboard (or 128k RAM, if you have the older model Sperry), seven expansion slots, the power supply, disk drive stack, keyboard connector and 2" speaker. All components are arranged similarly to the IBM PC - no surprises here. A note worthy feature is the front-mounted keyboard connector. This certainly makes sense, both from a cable-stretching and convenience point of view. Also, the disk drives are mounted in a frame which can be easily removed to service or add a second drive. A front-mounted on-off switch is within easy reach of the user.

The back end of the Sperry has the usual arrangement of expansion slot covers. There is also a built-in outlet for the monochrome display. The only complaint I have with the main system unit is that the power supply fan is loud and distracting. Some users were concerned about an irritating squeal occasionally emitted by the hard disk.

An important feature of the Sperry is its dual clock speed. The user can select an 8 or 4.77 MHz clock speed. At the higher speed, the Sperry can process data about 1.5 times faster than a standard IBM PC. Disk access times, however, are the same between both machines. Consequently, software will run faster on the Sperry than on the IBM PC. However, you would use the 4.77 MHz clock speed to run software that is timing dependent or uses time delays to check for copy protection. Also, some games really change their character when run at faster clock speeds. For instance, Flight Simulator at 8 MHz could be renamed Rocket Simulator!

More practical reasons for going to the slower 4.77 MHz speed is that some software was designed for that speed. For example, if you held down the ALT key on your PC and typed in a code number like 065, you would get a capital letter A showing up on your keyboard. Some programs, such as the Sidekick NotePad (a simple wordprocessor) are set up so that if you hold down the ALT key long enough, a menu comes up. At 8 MHz, you need only touch the ALT key before the menu comes up - you don't get the chance to punch in a number code like 065. This is similar to the "control sequence" problem encountered while using Wordstar with the Sanyo MBC 775 computer (see May issue of Compu-Farm). That's where it's nice to set the speed back down to 4.77 MHz.

The Sperry keyboard had 84 keys in a standard typewriter arrangement. The keyboard is adequate, but I found that there was a real lack of tactile response. That is to say, this keyboard has a soft "rubbery" or "mushy" feel. I found it difficult to type on this keyboard, and I'll bet that experienced typists will not relish it. On the plus side, there are LEDs on the NUM LOCK and CAPS LOCK keys to indicate which is active. Good idea. As well, there are raised dashes on the J and F keys, plus a raised dot on the 5 key of the numberpad. These features help you find the home keys on the keyboard without looking down at the keys, a sorely-missed feature not found on most keyboards.
When the IBM PC keyboard first came out, it was criticized due to the placement of the shift and backslash key, requiring users to develope an "extra-long reach" to use these keys. The Sperry keyboard, however, has the shift and backslash keys closer to where an average typist expects them to be. That means that regular PC users may have some degree of difficulty using the Sperry keyboard.

Something different about this computer system is the Sperry's "bring-up" test. You use this particular test to check for any internal faults within the main system unit. Here's how it works: you disconnect the keyboard, any monitors, modems, printers or other peripherals. Then you flip on the power switch. Within a few seconds, the computer's internal speaker starts to emit what sounds like morse code (that's CW for the Ham radio buffs), and a large LED (visible through a slot near the on-off switch) goes on (hopefully). If you hear a long beeeep followed by three short beeps (or dah dit dit dit), the machine is telling you that the keyboard is not connected and (internally) everything else checks out OK. But if you hear other sounds, like a beeeep beep (dah dit) and the LED flashes, then your RAM memory is acting up. The manual lists various combinations of dits, dahs and flashing LEDS, and what they all mean. But there's nothing in the manual for dit dit dit, dah dah dah, dit dit dit (SOS).

The Sperry ran just about all the software we had with the exception of some very specialized IBM PC utility programs. These programs tended to crash the machine, but then again, anyone with special requirements to run this kind of software should check out the software before committing him/herself to any hardware.

One source of trouble that was difficult to track down was the Rixon internal modem. Until we found the problem the Sperry would often refuse to power up. It took as may as ten tries to start up the machine most days. Removal of the modem corrected this problem. This indicated a problem with either the capacity of the power supply or with the Rixon modem itself. The hard-drive version of the Sperry requires a 13 Amp supply provided with the floppy disk machines. The problem was eventually tracked down to a conflict within the computer. It seems that both the computer and the modem used something called "IRQ4" to talk to the COM port (asynchronous communication ports).

The net result was that both the computer and the modem were trying to talk at once. The Rixon modem had two serial ports on it, and we could find no way to disable the serial port on the motherboard, hence the problem ... kind of like when Brian tries to retract a statement during question period... the point to remember here is to always check the equipment before you take delivery. This sort of problem is hard to pin down over long-distance phone calls.

DOCUMENTATION: MS-DOS, GUIDE TO OPERATIONS and **BASIC** are included with the Sperry. These manuals were well laid out and gave me all the information I needed to start using the Sperry, including complete data on switch settings, testing procedures and hardware installation. As with all basic manuals, Sperry's won't teach you the language, but does serve as an excellent reference guide.

COST: The cost of our test Sperry, decked out with 256k, one floppy disk drive, one hard drive, a color monitor, parallel port, serial port and clock, along with color and drive controller cards come to about $6200. A 256k unit with 2 floppy drives and a monochrome monitor, with parallel and serial ports will run you about $3200, although you can expect prices to change as Sperry dealers remain competitive with the rest of the PC market. Prices were supplied by Altel Data.

In summary, the Sperry PC is a good IBM PC compatible computer system. The cost of the system detracts from its appeal, as does the super-soft keyboard. If I were to invest in a Sperry, the first thing I would do is replace the keyboard with one that has a better feel for touch typing, although the original keyboard probably won't bother a new user.

My thanks to Wayne Effa, Systems and Communications Manager for Altel Data (and part-time farmer!) for providing me with the machine evaluated here.

VOLUME VI, NO. 9, NOVEMBER, 1985

COMPUTERS FOR CHRISTMAS

Yes, it really is that time of year again! Every Christmas we try to give you a short summary of the market, so that you can know what computer Santa can buy the kids, the spouse or you. This year is going to be no different. Judging by the media blitz and sale prices already on, manufacturers are eager to sell you a computer.

Last year we broke the market into 3 price ranges: 1) under $1400 2) $1400 to $2400, and 3) $2400+. These prices are for a "complete system" including computer, monitor, disk drive and printer. It seems that this year these prices will hold again, but please keep in mind that these prices are general ranges only, a bargain finder Santa could probably do better.

THE UNDER $1400 MARKET:

The home computer market has been very cut-throat for the manufacturers and there has been some instability in this market. As a result computers in this bracket can make nice Christmas presents, and won't break your pocketbook. While they are usually regarded as "game" computers, some have some decent software available and can be a good starting place, if you don't have a clear idea of what you need.

COCO2 - We gave it full marks this time last year, and there is a bit more software for it this year. Prices are: $200 for the 64k computer, $399 for a disk drive, $230 for a monitor, and $269 for a printer. Total is $1098. There still doesn't seem to be very much accounting or agricultural software available, but Radio Shack does list one spreadsheet program, and software and modems to connect with Grassroots are available.

C64 - Pick of the group last year, commonly it has been a very good seller (reports of 3,950,000 sold made it the biggest seller ever, even more than Apple and IBM). Sells for $200, plus $300 for color monitor, $300 for disk drive and $230 for printer - giving a total of $1030. Our Agricultural Software Directory lists 16 programs for it including 7 accounting programs. Software and hardware to connect to Grassroots are available.

TRS100 - Here we have a true portable that doesn't even try to have a "regulation" 25 line by 80 character screen, yet it seems to be doing quite well in the market. It includes a built-in 300 baud modem, and as a result, word processing documents can be transferred to almost any other microcomputer. Prices for a 24k model 100 are $829, plus $269 for a DMP 105 printer. It doesn't really qualify as a "system" under our definition, but we are mentioning it anyway.

Atari 800XL - While it seems to be mostly a games machine, there are spreadsheet and accounting packages available for it. A system totals $900-$1000.

BETWEEN $1400 AND $2400

This range finds the start of machines with the true capability to handle business records and still be affordable as machines for the kids.

Atari 520ST - Some industry observers believe that the 520ST will find a place in the market, if the company can live long enough. It uses the same 68000 CPU chip that the MacIntosh and Amiga use, and costs considerably less. A 512k system with color monitor totals $1980, and a second drive is $300.

PCJr - IBM still has many in stock, and prices are down quite a bit. We have been quoted $799 for the Jr. plus $90 for the operating system; $600 for color monitor, $150 for parallel card, $45 for cable and $455 for a printer. Total cost for the system: $2139 or $1724 with a monochrome monitor; not bad for a system that has the capability to run almost all the software that runs on the IBM-PC.

Tandy 1000 - We did a review in February and March, and there are no new details to add. Tandy has a big advertising campaign on right now, with special pricing. Prices including the DMP-105 printer are: $1668 with VM-2 monochrome monitor; $1868 with CM-4 color monitor; or $2068 with CM-2 color monitor. These prices make the machine quite attractive, but keep in mind that while the initial price may be low, you will end up paying more for any expansions. The Tandy has a slight speed advantage over the PC Jr., but actually has only 112k available for use compared to 128k with the Jr. This is our pick over the Jr.

Commodore 128 - The Commodore 128 has been left somewhere out in the back 40, with the announcement of the Amiga. While the 128 can run CP/M and C64 software, there is no compelling reason to purchase it over the C64 since there isn't much software to take advantage of the 128k. Systems price out in the $2000 range.

TRS 4D - A micro that has been around for quite a while. A 64k, 2 disk unit is priced at $1899, plus $269 for a printer, a total of $2168. In our Directory there are 129 different products listed, including 22 accounting applications.

Apple IIE+C - Apple's old workhorses are still responsible for the lion's share of its profits. These machines are familiar to almost anyone who has gone to school in the past few years and have quite a bit of software available for them. Our Directory shows 239 packages (21%) available for the Apple. While they are getting somewhat "aged", there are rumours afoot that Apple will be announcing new products for them. Our own preference is for the IIE, for the simple fact that it has slots and therefore adaptability. A IIc system totals about $2100 and IIE totals $2600.

OVER $2400:

Here we find the "power" machines. These are machines that can be difficult to justify on a pure cost-benefit basis, but the potential for hard work is almost limitless.

IBM-PC - AND COMPATIBLES - The largest group of computers available on the market today. Rather than give individual coverage let's just say: Find a no-name and pay less, find an IBM and pay more (but have the confidence of 100% compatibility). Some systems start at $2300 and can go up to the sky from there. Fifty-one percent of software in our listing was available for IBM's and compatibles, which only confirms the inroads that this "standard" has made in the business world.

MACINTOSH - A slow starter as far as software is concerned, (especially agricultural software), but very much running in the race now. Rumours of a new "modularized" MacIntosh abound. There are 18 entries in our directory, which is not a lot, but still respectable. A 512k Mac (the smallest we would recommend) would be $4500.

IBM-AT - This is very much a high-end business machine. It is probably hard for the average farm business to justify the cost, even of a compatible. Some compatible system prices start at $5500.

AMIGA - Unless you are a dedicated programmer, this is much too new to look seriously at for an agricultural computer. The company is having some financial problems and trying hard to get products developed by third party developers. $2800 will buy the Amiga with 256k (not enough), the analog color monitor, and a single disk drive. A total of $4150 will buy 512k, the monitor, and external 3.5" drive, a 5.25" external drive (for IBM compatibility), but still no printer.

AND THERE YOU HAVE IT! The key thing to remember always is to look at the purpose first, then pick the software, and then pick the hardware!

FARM LIFE - A GAME

Farm Life by Milton Bradley & Associates is a farming board-type game for the Commodore 64. The concept reminded me of the classic Monopoly-style game where each of 1 to 4 players operates a "farm", starting out with the same amount of money.

Dice rolls (with effective color graphics) move each player around the board through the production year. Depending on where you land, different things happen. In some cases, "expansion cards" allow purchase of more hay, grain, fruit, land, cows or machinery. Other board locations present "fortune cards" which may be either good (i.e. make money) or bad (i.e. fall from the barn, break your leg, and go back two months, paying $3000). Some board locations provide for harvest of crops or sale of calves, requiring a dice roll to determine prices and thus income.

Corner stops include income tax (payments), Lotto (winnings) and bank note (pay debts). For added interest, there are two cash stops which allow winning $50,000 or losing $10,000 depending on dice rolls.

As start-up, you have the option to name your one to four players and set the length of the game. Sound effects are included, e.g. Old MacDonald's Farm. All interaction beyond naming players and setting the length of the game is by joystick and menus.

I played the game by myself one evening, followed by a challenge match with my 11 year old son another night. The graphics, risk and chance to beat dad rated comments like "awesome city" and "cool game". When my 7 year old son came along, he immediately took over my joystick control turns because, "This is fun".

After playing for 1.5 hours and two rounds of the board, frustration time came when we tried to save our game status so that we could continue playing at a later time. Following the "save the game" menu option - recording on another disk (which happened to be full) produced a disk error - causing complete lock-up with no apparent way to regain control. Unhappiness reigned because son was whipping dad - and wouldn't be able to keep on next day.

I tried several times and ways to save an in-process game, but to no avail. The same lock-up was encountered. Thus, as our demonstration copy stands, it seems to be a one-time system. Perhaps some instructions (none supplied) could have helped us through the problems. (Subsequent talks with the author of the program indicate that we may have had a defective "pre-production" disk. There should be no problem saving game status. Also, directions are supplied on the disk.)

One other limitation encountered was the inability (at least none that we could find) to go back if a player inadvertently moved too quickly through a menu option and wished to retreat.

Overall, the game had enough entertainment value and realism (market skyrocket or collapse) to make it fun to play, especially for the cost. My sons felt their friends would also be interested in playing; they're planning a match after school. The game takes a somewhat simplistic view of farming as far as luck versus planning is concerned,but it is still a lot of fun to play.

Farm Life is available for $15.00 for Tidal Bòre Software, 230 Pleasant Street, Truro, Nova Scotia, B2N 3S8. Farm Life was written by Brad Kiefer, of Medicine Hat, Alberta, which makes it a home grown product!

AT & T 6300

An AT&T 6300 computer recently found its way into our office for evaluation. As it turns out, this MS-DOS, IBM PC compatible computer is really an Olivetti M24 in disguise, with a few small differences. An Olivetti M24 was reviewed in the September 1985 issue of Compu-Farm. Since the AT&T 6300 and M24 are similar in most respects, I'll mention only a few significant points. More details are in the September 1985 Compu-Farm mentioned above. I should note here that the documentation differs, as it refers to the computer as an AT&T 6300. As with any computer documentation, don't expect to learn how to program from the documentation - get a good reference manual instead.

Unlike and IBM PC, the AT&T 6300 can use 256k chips, bringing the total on-board memory up to 640k. The upgrade is available from AT&T dealers for about $100 US installed, (trading in your old 128k chips) per set of 256k. Note that the M24/6300 uses the 8086 CPU chip which allows the computer to run at a faster speed than an IBM PC. Another interesting feature of this computer is Olivetti's combination monochrome/graphics monitor. This high-resolution monitor allows both graphics and high-res text to be displayed, so you can look at graphs created by Lotus 123 with your high-res green screen, for example. To do this with a PC you would need two monitors and two display cards (or a special display card available from third-party manufacturers). To display color it requires an RGB color monitor available from Olivetti.

Like may PC compatibles on the market today, the

M24/6300 keyboard has LEDs on the numlock and capslock keys to indicate when each key is active. Also like many PC compatibles, keyboard "feel" is rather soft (the keys don't give me that solid feel of the better keyboards). As well, the two stacked half-height drives take some getting used to since drive B is located over drive A. Both drives have little front-mounted slide switches to lock the diskette-release latch. I don't know why Olivetti opted for these locks, since anyone can simply unlock the drive latch by flicking the lock switch.

A 256k machine complete with two floppy drives and a mono-graphics monitor, serial and parallel ports and battery-backup clock/calendar is priced at about $4500. Dealers may sell for less. My thanks to Bob Pocock, seed producer at Lacombe, for the use of his machine. As indicated above, for more information about the computer refer to the September '85 issue of the Compu-Farm newsletter (vol. VI, No. 7).

MAYBE

It's 6 o'clock and you just got back from town, where you wrote some cheques, paid some bills, and sold some grain. Throwing your keys on the table you speak in a soft voice to your computer HIM (Holistic Intelligent Machine). "HIM, I spent some money and sold some grain today" you say.

Q - "Hello Dave, I will enter this information into the books, if you give me more details." comes the mellow reply. "What did you buy?"

A - "I bought some filters and some oil for the 4WD tractor" you respond. "The total was $107.52."

Q - "Fine", responds HIM, "but I need to know how much for the filters and how many you bought."

A - "The 2 filters were $22. The rest was for the oil."

Q - "Was that $22 for each filter, or for both?"

A - "For both."

Q - "Good Dave, what else did you buy?"

A - "Nothing, but I paid our bill at the Coop. It was $1201.97."

Q - "Was that the entire bill?"

A - "Yes it was, HIM."

Q - "So that was material for the new shelter then. Did you spend any more money, Dave?"

A - "No, I didn't."

Q - "Now tell me about the grain you sold, Dave. What kind was it, how much, and what bin did it come from?"

A - "It was 4,021 bushels of malting barley from bin 4. We got $13,550.77."

Q - "I detect a note of pride in your voice Dave, congratulations on the good grade. Should I revise the inventory value for the rest of the bin?"

A - "Yes, it will all go malt. What does that increase our net worth by?"

Q - " Your net worth will increase by $5657.12. Is there anything else?"

A - "Yes HIM, I would like you to prepare a full set of statements and a cashflow projection for the next three years. I have to go to the bank tomorrow to renew our operating loan."

Now, this little scene is a look into the future, maybe. Artificial Intelligence may allow you to talk to your computer just like you would talk to your bookkeeper, with the bookkeeper (computer) asking for more information when it needs it. MAYBE.

VOLUME VI, NO. 12, FEBRUARY, 1986

MAYBE - THE PROMISE AND THE PITFALLS

Last month we presented the tale of MAYBE, where our hero (that's you) did all the bookkeeping with HIM (Holistic Intelligent Machine). We wrote this story as a preface to a discussion on Artificial Intelligence (AI) and what the benefits may be to agriculture. As computer programs started being used on microcomputers, the "in" thing for a program to be was "user friendly". Then came a short period where "intuitive" was the only way to be. Now, it seems, a program is just not worth its salt unless it has Artificial Intelligence in it. Jim Seymour, a columnist for PC-WEEK magazine, suggests that things are getting out of hand, and that he expects to start seeing gaudy yellow stickers on upgrade packages that say, "Now, New and Improved - With AI Added!" Somewhere between the promise and the myth is the reality of AI.

Despite the Madison Avenue approach, AI does have some things to offer agricultural computing. Artificial Intelligence can be broken down into three areas:

1) pattern recognition (including speech recognition and generation)
2) expert systems
3) robotics

Our story last month incorporated two of these features: speech recognition (no that doesn't mean that it can recognize the Gettysburg Address 9 times out of 10) and expert systems. Actually, if our imagination had let us, we could have had HIM write some cheques and mail them, and then had robotics too.

PATTERN RECOGNITION - HIM was able to verbally communicate with Dave, which is obviously an advantage. Speech generation can be done with present technology, but it tends to be rather "piggy" with disk storage space and requires a lot of computing power. Speech recognition is available right now, but systems need to be trained to one user's voice, are limited to vocabularies of less than a few hundred words, and usually understand only single words, not phrases. A related concept is Natural Language, where the computer can understand groups of words and even whole sentences. Once again, it takes a lot of disk storage to accomplish, and there is a long training process for the computer. The combination of verbal communication and natural language is presently too much for a microcomputer to handle well.

EXPERT SYSTEMS - HIM demonstrated some prior knowledge of Dave's bookkeeping methods and also knew what had been going on in the past. HIM knew that the account at the Coop was all for construction materials and also knew that since the load of barley had gone malt, that the inventory value should be adjusted. HIM had all the knowledge an expert bookkeeper should have to prepare financial statements to take to the bank to renew an operating loan. Expert systems are also with us now, but take up a lot of computing power and disk space. It generally takes a "knowledge engineer" to get the rules and knowledge out of the expert and into the computer. Expert systems on a microcomputer are not fast, and certainly not fast enough to work along with pattern recognition at the same time.

THE PROMISE: computer systems will allow you to communicate with a computer exactly like you would communicate with an expert.

THE REALITY: microcomputer technology is just not powerful enough yet. Someday MAYBE!

VP-PLANNER - AN ECONOMICAL ALTERNATIVE TO LOTUS 123

An electronic spreadsheet is one of the most valuable software packages in your software library. Whether you juggle cashflows, loan calculations, ration balancing, bookkeeping, chart market prices or perform any computer chore involving numbers, a good electronic spreadsheet is indispensible to the farm business.

To date, the top-selling spreadsheet is the very successful Lotus 123 for IBM PC's and compatibles, so named because it combines an electronic spreadsheet with an "information manager" and a graphics program. The only rub is that the Lotus 123 retails for about $500 - $600.

We recently had the opportunity to use VP-Planner, one of the latest software offerings from Paperback Software (owned by Adam Osborne, the man who brought us the world's first "luggable" computer - the Osborne One). Let's take a look at this software package.

Imitation is the sincerest form of flattery. VP-Planner (VPP for short) is an electronic spreadsheet modelled after Lotus 123. It has most of the features of 123 plus a few which Lotus doesn't have. Past users of 123 will be instantly at home with VPP, which uses the same commands and menu structure as does 123; the only difference is that the menu is on the bottom of the screen instead of at the top.

As well, 123 version 1A worksheet files are mostly compatible with VPP. We encountered a few problems with some of our complicated macros, and also had problems with some range micros that were not interpreted correctly.

Let's look at some of the differences between VPP and 123: to start with, you must go through an installation procedure to set up Lotus for your hardware the first time you use Lotus. While not overly difficult, it is an extra step which challenges the first-time user. VPP has no configuration files for you to worry about. It checks what hardware is present and adjusts itself accordingly. In addition, you can change such things as the foreground, background and cursor colors of VPP (if you have a color screen) while working inside the spreadsheet.

VPP provides a more sophisticated "information manager" (database) than Lotus 123, since VPP is capable of linking together several worksheets and treating them as one data base. This can be very difficult to do with Lotus. VPP also allows you to create, access or modify dBase II and dBase III datafiles directly instead of through a translate process as Lotus requires.

Other interesting features include the ability to make columns zero characters wide. This means you can write formulas or data into the worksheet, shrink the column width down to zero and (presto!) the data is hidden, and other users won't have extra material to read or modify.

An "autokey" learning sequence is available for macro design. Instead of typing in commands to create a macro, just activate this feature, and the spreadsheet will automatically create macros for you.

One disadvantage of VPP is that when it prints a graph, it does a sample graphic screen dump to the printer, as opposed to the nice quality graphs that Lotus 123 can produce. This is a fair trade-off, considering the price of VPP.

Also, the DIF (data interchange format) file transfer option in this version of VPP doesn't work. Paperback Software promises to get this functioning, and send an update to registered users.

VPP comes from Paperback Software as a 9 x 7.5 inch (you guessed it!) paperback software manual. Two floppy disks are enclosed - one is the copy-protected VP planner disk, the other is sample files. The comprehensive "Getting Started" section of the manual tells the user how to fire up VPP and get going. A screen menu guides the user through the system.

Summary: There are some features which first-time users will truly appreciate. First, VPP is affordable - the list price of $138 is much easier to swallow that $500. Second, there are no configuration files to struggle with - VPP come "ready-to-run". Third, VPP eats most Lotus 123 WKS datafiles, so you have access to files produced by 123 users. As a proviso, the recent Lotus version 2.0 produces WK1 files - which VPP can't use (yet). Lastly, VPP has all the menu features of Lotus 123, so if you have seen one, then you know the other. No new commands to learn. For the price, VPP is my kind of spreadsheet!

VOLUME VII, NO. 1, MARCH, 1986

Provides some good definitions and is the beginning of a series which will show how to create a customized system.

BOOKKEEPING WITH A SPREADSHEET

This is the introduction to a series of articles that will deal with keeping a set of books on an electronic spreadsheet. As we go through these articles, we will develop some simple bookkeeping systems that should be able to be used with any commercial spreadsheet program, and consequently on just about any microcomputer. As we develop our books, we will discover small problems that will require us to back up and make changes. We will, of course, learn some things about bookkeeping as we go, too. The first system that we build will be based on Alberta Agriculture's book "Income & Expenses - Basic Records for Alberta Farmers". You may want to get one from your District Agriculturist if you intend to follow along in this series.

WHAT IS AN ELECTRONIC SPREADSHEET? - If you are the kind of person who often irritates your spouse or waitress because you are scribbling numbers on napkins and tablecloths, then a spreadsheet may be just the thing for you. An electronic spreadsheet can be thought of as a cross between a calculator and a piece of paper. Most things that you can do on a piece of paper (except doodling, etc.) can be done on a spreadsheet. A spreadsheet is divided into columns and rows, and wherever a row and a column meet is a "cell". There are three types of things that can go into a cell: 1) a label - which is words, such as the description of our transaction (fuel). 2) numbers - such as 1011.00 that is the amount we spent. 3) formulas - which tell the spreadsheet that we want a total of a column.

THE INCOME AND EXPENSES BOOK - is what we call a modified double entry system. It consists of an Expense section and an Income section. Modified double entry refers to the fact that all transactions are considered to be cash transactions and go through cash or bank accounts. In a bookkeeping system such as Alberta Agriculture's "Income & Expenses - Basic Records for Alberta Farmers", various expense and income accounts are in columns and the entries for the month are in rows. We record a transaction such as buying fuel by entering the cheque in the Bank Withdrawal column and entering the amount in the Fuel Expense column. We can do exactly the same thing with an electronic spreadsheet, and it will even add the totals for us automatically.

THE SIMILARITIES - Both the spreadsheet and our Income and Expense book have rows and columns. Both involve entries of labels and numbers, and we need to do totals and deductions, etc.

THE STRENGTHS AND WEAKNESSES - Because of the similarities the temptation is strong to want to keep our records in a spreadsheet. A spreadsheet is most powerful when numbers are changing often such as in budgeting and analysis. It can save us the work of erasing all numbers that change as a result of the change in another number. Numbers do not change often in our Income and Expense book (except when we make mistakes) so we will not be taking advantage of this greatest strength. There will be a lot of duplication in our system due to each month being a lot like all other months, so our spreadsheet will start to "eat" memory quickly.

WHY USE A SPREADSHEET? - The main reason is because we already have a spreadsheet so our system will not cost us anything. We will also be able to learn more about bookkeeping, and will have a "customized" system that will be able to do what we want it to (at least that is what we hope).

NEXT MONTH - We will start to enter the labels and formulas for a blank month that will then be used as a template for all other months.

VOLUME VII, NO. 2, APRIL, 1986

Again reinforces the idea of how simple it is to use the RBBS.

THE COMPU-FARM REMOTE BULLETIN BOARD SYSTEM

We have changed our Bulletin Board software! The new program (RBBS-PC) is easier for us to maintain, and easier for you to find files to download and upload.

What do you need to dial into our bulletin board (and others)? You need a microcomputer, a telephone modem, a communications program and a telephone line. Our bulletin board can be accessed at either 300 BPS or 1200 BPS. First, it answers the phone at 300 BPS, no parity, 8 data bits, and 1 stop bit. It then waits for 3 carriage returns from you to determine what parameters you are using. If you are having problems, just remember, press your return key 3 times, slowly, don't try changing parameters just to match our system.

Once you are connected to the board, you will get a short (WELCOME TO THE COMPU-FARM RBBS) message, and it will ask you for your FIRST NAME and then your LAST NAME. If you have not signed on before, it will ask you for your CITY and PROV, and for a PASSWORD. The password is not optional, and you should get used to using one, it prevents others from reading your private messages, etc.

The next thing to happen is the Bulletin section. Here we have some fast breaking news, some cute opinions, etc. This is where we will describe anything that is new and important.

You will then get to the main menu which looks like:

```
=========================  RBBS  MAIN  MENU  =========================

    PERSONAL COMMUNICATIONS             UTILITIES           ELSEWHERE
B)ulletins         O)perator         H)elp
C)omment           P)ersonal mail    L)ines per page    F)iles system
E)nter message     Q)uick scan       X)pert on/off      G)oodbye
I)nitial welcome   R)ead messages    ?)Functions        U)tilities
K)ill message      S)can messages
```

Other than the PERSONAL section (which is where you receive and leave messages) the main area of interest is the ELSEWHERE section. In here you can use the U)tilities to change your password, file transfer method, etc. This is also where you get to the F)iles system!

When you select the F)iles system you will get a listing of the different types of programs that we are maintaining:

```
#   DESCRIPTION:
1   COMPU-FARM ARTICLES FOR THE PAST YEAR (WITH REVIEWS)
11  ADA BASIC PROGRAMS AND DOCUMENTATION FOR IBM-PC AND COMPATIBLES
12  ADA BASIC PROGRAMS AND DOCUMENTATION FOR TRS - III AND IV
21  ADA LOTUS 123 TEMPLATES AND DOCUMENTATION
22  ADA VISICALC  TEMPLATES AND DOCUMENTATION
31  GENERAL UTILITIES FOR IBM AND COMPATIBLES
41  THE FINANCE MANAGER- DOUBLE-ENTRY GENERAL LEDGER FOR IBM AND COMPATIBLES
51  THE GRAB BAG - PROGRAMS CONTRIBUTED BY OTHERS - YOU TOO?
```

To get a listing of directory 12 (ADA BASIC PROGRAMS AND DOCUMENTATION FOR RADIO SHACK) simply use the L)ist command like this: L;12. You will then see:

RENAME FILES WITH A TRS EXTENSION TO /BAS EXTENSIONS:

```
HELLO    TRS      7762 03/30/86  Main menu program for rest of ADA programs
BESTCROP TRS     14655 03/30/86  Crop comparison budgets
BESTCROP DOC     15488 03/30/86  Documentation for BESTCROP
BFP      TRS     27427 03/30/86  Breakeven beef Feeder Prices
BFP      DOC     22298 03/30/86  Documentation for BFP
CARCOST  TRS     13574 03/30/86  CAR and truck COST calculator
CARCOST  DOC     10290 03/30/86  Documentation for CARCOST
etc...
```

To download the BESTCROP TRS file you need to ask for it like this: BESTCROP.TRS using a period between the filename and the extension.

We are also introducing a new feature: THE GRAB BAG! which is an area where YOU can send files to us for sharing with others, evaluation or whatever. Do you have a spreadsheet template that you are particularly proud of? One that the rest of the world could use? We know that you do, you don't need to be modest. Just dial our bulletin board, and upload it to us.

The second article of the series showing how simple a spreadsheet can be to use.

BOOKKEEPING WITH A SPREADSHEET

It is now time for the first installment of our Bookkeeping With A Spreadsheet (BWAS) project. Judging from the response we got from last month's article, this is a hot area of interest. Let's start this month with a description of where we are going with these projects:

PROJECT #1: will be a simple knockoff of our "Income & Expenses - Basic Records for Alberta Farmers". It will be done with VisiCalc, so the listings will be so generic that almost any spreadsheet on any microcomputer will be able to use it. Don't expect a lot out of this one because it is simple, but it does work. What it also does, is show some of the reasons that spreadsheets are not normally the tool we use to do bookkeeping.

PROJECT #2: will be the same as number 1, except it will be done in Lotus 123 and will use some of the macro programming functions to automate the posting process. Other spreadsheets on other computers can also work if they have macros.

PROJECT #3: will use VP-PLANNER (reviewed in February 1986) and its ability to manipulate multi-dimensional spreadsheets. By this time we will be pretty well restricted to MS-DOS compatible machines.

PROJECT #4: will use VP-PLANNER again and its abilities to manipulate DBase II and III files.

THIS MONTH'S PROJECT (#1): You can enter the following listings directly to VisiCalc. If you are using some other spreadsheet, you may have to change some of the formulas and syntax. (Those of you who have modems may wish to call our Bulletin Board and download the files: BWAS1A.VC, BWAS1B.VC, BWAS1C.VC, and BWAS1D.VC to avoid the hard work).

THE INCOME SHEET:

```
>H39:/F$@SUM(H38...N38)
>E39:/F$+D38+E38
>C39:"GRAND TOTAL ---->
>N38:/F$@SUM(N7...N36)
>M38:/F$@SUM(M7...M36)
>L38:/F$@SUM(L7...L36)
>K38:/F$@SUM(K7...K36)
>J38:/F$@SUM(J7...J36)
>I38:/F$@SUM(I7...I36)
>H38:/F$@SUM(H7...H36)
>E38:/F$@SUM(E7...E36)
>D38:/F$@SUM(D7...D36)
>C38:"TOTALS ->
>N37:"**********
>M37:"***********
>L37:"***********
>K37:"***********
>J37:"***********
>I37:"***********
>H37:"***********
>G37:"***********
>F37:"******************
>E37:"***********
>D37:"***********
>C37:"***********
>B37:"***********
>G36:"*
>G35:"*
>G34:"*
>G33:"*
>G32:"*
>G31:"*
>G30:"*
>G29:"*
>G28:"*
>G27:"*
>G26:"*
>G25:"*
>G24:"*
>G23:"*
>G22:"*
>G21:"*
>G20:"*
>G19:"*
```

```
>G18:"*
>G17:"*
>G16:"*
>G15:"*
>G14:"*
>G13:"*
>G12:"*
>G11:"*
>G10:"*
>G9:"*
>G8:"*
>G7:"*
>N6:"SALES
>M6:"INCOME
>L6:"OTHER
>K6:"BARLEY
>J6:"WHEAT
>I6:"OTHER
>H6:"BEEF
>G6:"*
>F6:"DESCRPTIVE NOTE
>E6:"RECEIVED
>D6:"DEPOSIT
>C6:"REF #
>B6:"DAY
>N5:"CAPITAL
>M5:"OTHER
>J5:"CROP INCOME
>I5:"E
>H5:"LIVESTOCK INCOME
>G5:"*
>E5:"CASH
>D5:"BANK
>B4:"JANUARY
>C3:"R INFLOW
>B3:"INCOME AND OTHER
/W1
/GOC
/GRA
/GC15
```

THE EXPENSES SHEET:

```
>H39:/F$@SUM(H38...N38)
>E39:/F$+D38+E38
>C39:"GRAND TOTAL ---->
>N38:/F$@SUM(N7...N36)
>M38:/F$@SUM(M7...M36)
>L38:/F$@SUM(L7...L36)
>K38:/F$@SUM(K7...K36)
>J38:/F$@SUM(J7...J36)
>I38:/F$@SUM(I7...I36)
>H38:/F$@SUM(H7...H36)
>E38:/F$@SUM(E7...E36)
>D38:/F$@SUM(D7...D360
>C38:TOTALS ->
>N37:"*********
>M37:"**********
>L37:"**********
>K37:"**********
>J37:"**********
>I37:"**********
>H37:"**********
>G37:"**********
>F37:"*****************
>E37:"**********
>D37:"**********
>C37:"**********
>B37:"**********
>G36:"*
>G35:"*
>G34:"*
>G33:"*
>G32:"*
>G31:"*
>G30:"*
>G29:"*
>G28:"*
>G27:"*
>G26:"*
>G25:"*
>G24:"*
>G22:"*
>G21:"*
>G20:"*
>G19:"*
>G18:"*
>G17:"*
>G16:"*
>G15:"*
>G14:"*
>G13:"*
>G12:"*
>G11:"*
>G10:"*
>G9:"*
>G8:"*
>G7:"*
>N6:"SALES
>M6:"EXPENSES
>L6:"PURCHASES
>K6:"EXPENSES
>J6:"SUPP/SERV
>I6:"SUPP/SERV
>H6:"PURCH.
>G6:"*
>F6:"DESCRPTIVE NOTE
>E6:"PAID
>D6:"WITHDRAWL
>C6:"REF #
>B6:"DAY
>N5:"CAPITAL
>M5:"OTHER
>L5:"CAPITAL
>K5:"MACH/BLDG
>J5:"CROP
>I5:"LVSTK
>H5:"LVSTK
>G5:"*
>E5:"CASH
>D5:"BANK
>B4:"JANUARY
>C3:"HER OUTFLOW
>B3:"EXPENSES AND OT
/W1
/GOC
/GRA
/GC15
```

THE INCOME SUMMARY SHEET:

```
>O20:@SUM(O7...O19)
>N20:@SUM(N7...N19)
>M20:@SUM(M7...M19)
```

```
>L20:@SUM(L7...L19)
>K20:@SUM(K7...K19)
>J20:@SUM(J7...J19)
>I20:@SUM(I7...I19)
>H20:"*
>G20:@SUM(G7...G19)
>F20:"GRAND TOT.
>H18:"*
>F18:"DECEMBER       ?????
>H17:"*
>F17:"NOVEMBER       ?????
>H16:"*
>F16:"OCTOBER        ?????
>H15:"*
>F15:"SEPTEMBER      ?????
>H14:"*
>F14:"AUGUST         ?????
>H13:"*
>F13:"JULY           ?????
>H12:"*
>F12:"JUNE           ?????
>H11:"*
>F11:"MAY            ????
>H10:"*
>F10:"APRIL          ?????
>H9:"*
>F9:"MARCH           ?????
>H8:"*
>F8:"FEBRUARY        ?????
>H7:"*
>F7:"JANUARY         ?????
>H6:"*
>G6:"monthly tot.
>O5:"SALES
>N5:"INCOME
>M5:"OTHER
>L5:"BARLEY
>K5:"WHEAT
>J5:"OTHER
>I5:"BEEF
>H5:"*
>F5:"DESCRPTIVE NOTE
>E5:"RECEIVED
>D5:"DEPOSIT
>C5:"REF #
>B5:"DAY
>O4:"CAPITAL
>N4:"OTHER
>K4:"CROP INCOME
>I4:"LIVESTOCK INCOME
>H4:"*
>E4:"CASH
>D4:"BANK
>D2:"MMARY **
>C2:"R INFLOW  ** SU
>B2:"INCOME AND OTHE
/W1
/GOC
/GRA
/GC15
```

THE EXPENSES SUMMARY SHEET:

```
>O20:@SUM(O7...O18)
>N20:@SUM(N7...N18)
>M20:@SUM(M7...M18)
>L20:@SUM(L7...L18)
>K20:@SUM(K7...K18)
>J20:@SUM(J7...J18)
>I20:@SUM(I7...I18)
>H20:"*
>G20:@SUM(G7...G18)
>F20:"GRAND TOT.
>H18:"*
>F18:"DECEMBER       ?????
>H17:"*
>F17:"NOVEMBER       ?????
>H16:"*
>F16:"OCTOBER        ?????
>H15:"*
>F15:"SEPTEMBER      ?????
>H14:"*
>F14:"AUGUST         ?????
>H13:"*
>F13:"JULY           ?????
>H12:"*
>F12:"JUNE           ?????
>H11:"*
>F11:"MAY            ?????
>H10:"*
>F10:"APRIL          ?????
>H9:"*
>F9:"MARCH           ?????
>H8:"*
>F8:"FEBRUARY        ?????
>H7:"*
>F7:"JANUARY         ?????
>H6:"*
>G6:"monthly tot.
>O5:"SALES
>N5:"EXPENSES
>M5:"PURCHASES
>L5:"EXPENSES
>K5:"SUPP/SERV
>J5:"SUPP/SERV
>I5:"PURCH.
>H5:"*
>F5:"DESCRPTIVE NOTE
>E5:"PAID
>D5:"WITHDRAWL
>C5:"REF #
>B5:"DAY
>O4:"CAPITAL
>N4:"OTHER
>M4:"CAPITAL
>L4:"MACH/BLDG
>K4:"CROP
>J4:"LVSTK
>I4:"LVSTK
>H4:"*
>E4:"CASH
>D4:"BANK
>D2:" SUMMARY **
>C2:"HER OUTFLOW  **
>B2:"EXPENSES AND OTHER OUTFLOW  ** SUMMARY **
/W1
/GOC
/GRA
/GC15
```

NEXT MONTH: we will make some entries and show how to use these sheets.

COMPUTER MARKETS

Deciding which computer to buy is a common problem. Traditional wisdom says to buy the software first and then buy the computer to run it on. This sound is advice, but it is not that easy to find the software first when you are new to the world of computing and unfamiliar with how things work. To get a proper understanding of the workings of software, you usually have to try it out for a period of time, but if you don't even have a computer, how can you do that?

One approach you may try is to examine the market.
If there is a leader in the market segment that you are looking at, then maybe, by simply going with that leader, you will be assured of the greatest choice of software.

Computer sales seem to have established themselves into 3 main markets: Home, Education and Business. The graphs to the left show who has what. Graphs are used by permission of InfoWorld Magazine.

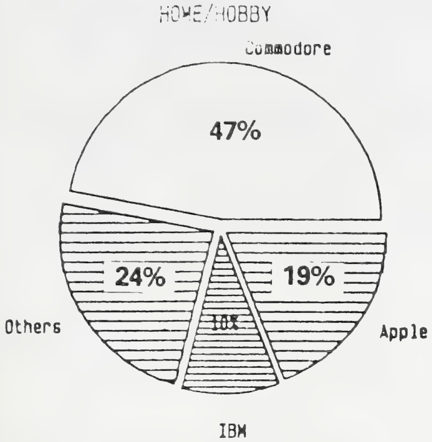
The top graph shows the HOME/HOBBY market for 1984. Total sales in this category were 3.6 million units, making the Home market the largest market.

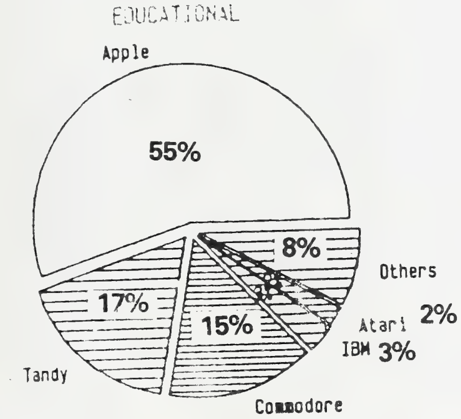
The middle graph shows the EDUCATION (kindergarten to grade 12) market for 1985. Total sales in this category was 0.4 million units (in 1984), making it the smallest category. Here, Apple is the leader but actually lost market share between 1984 and 1985. "Gainers" in the market share were Tandy (with their Tandy 1000) and IBM.

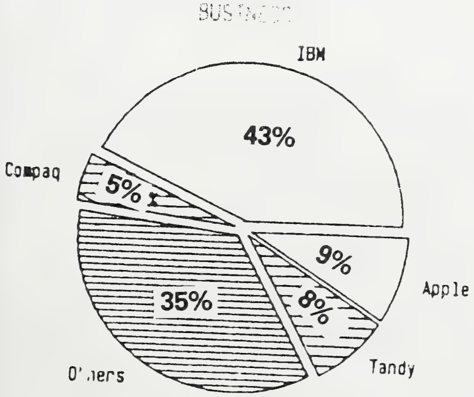
The BUSINESS market graph is for 1984. Total sales in 1984 were 2.6 million units. Here, IBM [illegible] the leader, and if you also include Compaq (an IBM compatible) and Tandy (with their Tandy 1000 and 1200), then MS-SOS machines account for over 50 percent of the market.

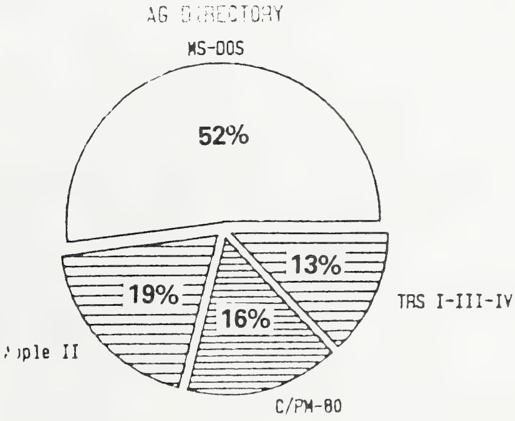
The last graph is the distribution of software as listed in our Agricultural Software Directory (February 1986). MS-DOS machines have more agricultural software available for them than all others combined. Actually, 86 per cent of the programs listed in our directory are available for MS-DOS.

Most people want to use the computer for a number of things: they want their children to be able to use it for school work; they want to play a few games on it and they want to use it on their farm. However, few people would want to buy more than one computer. Trying to combine purposes may cause a few problems with the above approach, so it is wise to weigh your needs carefully.









THE ADOPTION OF INNOVATION

Computers are an innovation and innovations are usually adopted over a period of time. Some people adopt the innovation faster than others, and some only adopt it at the very end. The adoption of tractors is an example. Before tractors, field work was done by horses or mules. The first tractors to come out were restricted and had problems. In the Depression there was actually a decline in the number of horses due to low feed prices and low labour costs. It was cheaper to hire workers and feed a team of horses than to operate a tractor. In many cases the team of horses got the job done faster, too.

Then came rubber tires, power take-offs and higher feed and labour costs. All of a sudden, tractors made sense, and the number on farms in Western Canada grew as more and more people started owning and using them.

As innovations are adopted, they continue to develop and change. There are several kinds of people involved in the development of innovations. Our graph shows the adoption process.

INNOVATORS - are eager to try new ideas. When Innovators start to adopt an innovation, there are not a great number of practical applications. Frequently it is a "try it and see" approach. Because few standards have been developed, Innovators become an important part of the establishment of standards. Innovators usually have a high level of management skills and consequently have very specific needs for information.

EARLY ADOPTERS - are open minded. They wait for the potential value of an innovation to be developed but are still eager to go at it early. Their demands are less specific than the Innovators, and they are more willing to change their methods since some standards have been developed. They still have a major part to play in the establishment of standards. Their needs are different than the Innovators, and they outnumber the Innovators 4:1.

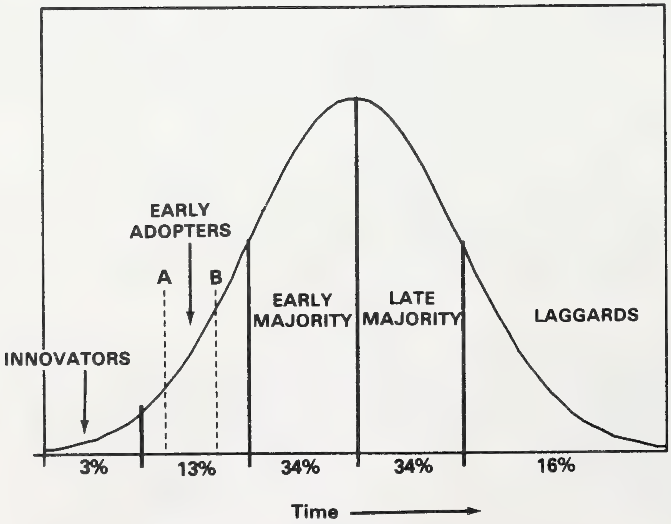
THE EARLY MAJORITY - do things intentionally. They adopt new ideas just before the average person. By the time they adopt, the value of the innovation has been well proven, but they still play an important role in "legitimizing" the innovation. They have even less specific needs than the Innovators and the Early Adopters. The Early Majority accepts the standards pretty well as they are but still play some part in development.

THE LATE MAJORITY - are doubtful. They adopt just after the average person does. Adoption may be because of economic necessity or social pressure. They can be convinced of the value of new ideas but must be influenced by the pressure of others to adopt. Their requirements and specific needs are less again, and they play a very small role in setting standards.

LAGGARDS - live in the past. They are the last to adopt. They have low needs and no influence in the development of standards.

In our graph, the lines marked A and B are our estimates of the number of computers on farms in Alberta. Why two lines? We used two lines because we believe that the number of computers on farms has at least doubled in the past year. Line A represents the average (5%) of several surveys conducted in 1983 and 1984. Line B represents where we think we are now. There is a close correlation between line A and the Innovators group. At the time that these surveys were done, it was mostly Innovators who had computers.

THE ADOPTION PROCESS



A number of things have happened in the past six months that may have made a major change in the number of computers on farms in Alberta. The most important was the tough economic times we find ourselves in and the resulting emphasis on farm financial management. Computers are being regarded as a probable tool in the quest for better management. Second was the marked reduction in prices that has occurred, especially in the past six months (in time for Christmas 1985). A very capable computer system can be purchased for less than the price of an ATC three-wheeler.

Our estimates present some important implications. The most important one is that the person who is entering the computer market now is a different person than those who are already in it. We believe that those entering now are the Early Adopters, whose needs are not as high or as specific as the Innovators. Some of the software developed to date exceeds these needs. As the adoption process continues, this will become even more marked as the Early Majority becomes involved.

The important thing about this process is that you need to keep your own needs in mind when choosing software. Your needs may not be the same as those for whom the software was developed. Just because programs are full-featured does not mean they are right for you; your needs may be much simpler. You have a role to play in the development process.

VOLUME VII, No. 4, JUNE, 1986

BOOKKEEPING WITH A SPREADSHEET

This is the second installment of the Bookkeeping With A Spreadsheet project (BWAS). This month, you will take the spreadsheets that were included in the April issue of CompuFarm and learn how to add entries to them. Before you can get started, you have to correct a few errors in the spreadsheets:

TO OUR BULLETIN BOARD USERS: If you downloaded the spreadsheets from our bulletin board, the wrong version of the file BWAS1A.VC was accidently used and may not load correctly into your spreadsheet when downloaded. The corrected version of the file has been placed on the bulletin board, so you may want to try again.

TO ALL VISICALC USERS: The income and expense sheets (files BWAS1A.VC and BWAS1B.VC) will not work correctly as supplied. In order to work properly, you must set the row order of recalculation. To do this, enter the command "/GOR". See the section of your Visicalc manual dealing with Global commands for more information. If the wrong order of recalculation is used, the grand total of all accounts on the income and expense journals may be incorrect.

Sorry about the mistakes. The responsible party has been given 20 lashes with a floppy disk, and promises not to do it again!

Now, on to this month's installment. Keep in mind that the spreadsheets you are developing are based on the "Income and Expense - Basic Records For Alberta Farmers" record book which is available from your district agriculturist, so it is worthwhile to get a copy for more examples.

Step 1: Obtaining the spreadsheets.

If you haven't already obtained the following spreadsheets, refer to the April '86 issue of CompuFarm and do so.

BWAS1A.VC - Monthly income journal.
BWAS1B.VC - Monthly expenses journal.

These spreadsheets are used to keep track of the income and expense entries each month. Eventually, you will have twelve copies of each journal, one for each month.

BWAS1C.VC - Annual income summary.
BWAS1D.VC - Annual expense summary.

These spreadsheets are the annual summaries of income and expenses. They will be the topic to next month's BWAS installment.

Step 2: Setting up the spreadsheets for your farm.

The first thing you have to do is take the generic spreadsheets and set them up for your particular operation. As supplied, the income journal has seven account headings; beef, other livestock, wheat, barley, other crop, other income, and capital sales. The expense journal also has seven account headings; livestock purchases, livestock supplies/services, crop supplies/services, machinery/building expenses and capital sales.

You will need to change these account names to ones you will need and will need to know how to add additional accounts if necessary. Changing the account names is easy; each account name is just a label which identifies a particular column in the income/expense spreadsheet. You can add, delete or change account names any time you wish, but make sure that any entries made in that account's column are also changed or erased. You are more likely to run into trouble deleting account names. It is safer to change account names at year end only when you start out with blank journals and summaries.

Adding new accounts is a little more difficult but still easy. The quickest way is to go to the farthest right column of the ledger journal and copy the new account into the blank column immediately to the right of the original journal. The actual commands used to copy a column vary from one spreadsheet to another, but the general procedure goes something like this (assume you want to add another account to the monthly income journal - file BWAS1A.VC.):

1. Move the cursor to the first cell you want to copy from, in this case, the top of the farthest right column of the journal. If you are using the unmodified income journal, this would be cell N5.

2. Give the spreadsheet the command to copy cells. In VisiCalc the command is /R and in Lotus 123 it is /C.

3. Move the cursor to the last cell you want to copy from, which is the bottom of the farthest right column of the journal. In our example, that would be cell N38. Hit the return key to tell the program you have finished indicating which cells you want copied.

4. Move the cursor to the top of the column immediately to the right of the one from which you are copying. In this example, that would be cell O5. Hit the return key to start the copying process.

5. If you are using VisiCalc, at this point the program will prompt you if you want "no change" or "relative addressing" when copying cells. For now, you want relative copying, so answer "R". (Lotus 123 users do not have to worry about this step). For more information on relative versus absolute addressing, consult your program manual under sections dealing with "cell addressing", "copying", or "moving".

6. Once you have successfully copied the column, change the account name to the name you want.

Once you have added new accounts and have changed all the account names that you want, save the spreadsheet again without putting any entries into it. This is important because you always want to keep a copy of your "blank" income or expense sheet handy, so that at the beginning of each month you can start with a clean slate. Then make any required changes to the monthly expense journal and to the income and expense summaries. Make sure that the account headings on the monthly journals and the annual summaries match.

Step 3: Making simple entries.

You're now ready to start entering transactions into your spreadsheet accounting system. It is generally best to make entries to your accounts at least monthly, more often if possible.

Once you have gathered the month's invoices, receipts, bills and cancelled cheques, sort them and decide which account they should be entered into. Keep in mind these points:

- Items charged on account but not paid for should not be entered into the monthly expense journal. These items are called accounts payable and must be kept separately. When a payment is made on the account, it is then entered into the journal. This is called cash accounting, which is used by most farms, as opposed to accrual accounting, which is used by business.

- Produce sold but not yet paid for is recorded in accounts receivable and is only recorded in the income journal when payment is actually received.

- Make sure records of all expenses paid by cash and all bank withdrawals taken out in cash are accounted for. It is considered good accounting practice never to pay for farm purchases with cash so that the cancelled cheques can act as records of purchase.

Let's say you are ready to make June's entries into the expense journal. To start the month's entries, load in the empty expense journal we created in Steps 1 and 2 (file BWAS1B.VC). Enter each transaction completed during the month, one to a line.

For example, say you find an invoice among your records. To enter this invoice into your accounts, you need to know these things about it:

Date of transaction: June 11, 1986
Cheque or reference number: 76
Bank withdrawal: $16.85
Cash paid: $0.00
Description: Truck parts
Account affected: MACH/BLDG EXPENSES

Fred's Auto and Truck Parts
5030 - 50 Street
Olds, Alberta

Date: June 11 1986_
Sold to: The Funny Farm
Address: Box 2000, Olds

```
1  : B4573-5 Gasket          :  12.95
   :                         :
2  : B4528-4 Bolts  @1.95    :   3.90
----------------------------------------
Total:                        :  16.85
----------------------------------------
      Paid, Cheque # 76
```

Figure 1 shows how the completed entry should look when placed into the expense journal spreadsheet.

FIGURE 1

```
EXPENSES AND OTHER OUTFLOW
JUNE
                      BANK       CASH                      *   LVSTK       LVSTK       CROP        MACH/BLDG   CAPITAL     OTHER       CAPITAL
DAY         REF #     WITHDRAWL  PAID       DESCRPTIVE NOTE*   PURCH.      SUPP/SERV   SUPP/SERV   EXPENSES    PURCHASES   EXPENSES    SALES
June 11               76         16.85      0.00 Truck parts *                                          16.85
```

Notice that as soon as you complete the entry, total bank withdrawals for the month and the current balance of the MACH/BLDG EXPENSES account is updated. (Aren't spreadsheets wonderful?!)

Now try a typical income entry. First, save the expense journal for June. MAKE SURE THAT YOU USE A DIFFERENT FILE NAME. A suggestion, I would use BWASJUNE.VC (short for Bookkeeping With A Spreadsheet), and load in the "blank" income journal (file BWAS1A.VC). Here is the transaction you want to enter:

Sunshine Auction Mart   Date: June 13, 1985
Box 154   Cheque: 4563
Olds, Alberta

Pay to the order of: The Funny Farm $1257.75
One thousand, two hundred and fifty seven-75/100

First National Sunshine Bank
Box 320, Olds, Alberta

```
Goods sold :   Price     :Number      :Total
----------------------------------:------
Hay bales  :    3.25 :  430      :1397.50
           :             :               :
           :             :           :
---------------------------------------------
Total      :             :           :1397.50
```

When you have entered this transaction into the income journal spreadsheet it should look like the spreadsheet in Figure 2.

Notice that the GRAND TOTAL of the BANK DEPOSIT and CASH RECEIVED columns should be equal to the GRAND TOTAL of all the various income accounts. This is the main advantage of a modified double-entry accounting system; any mistakes made when entering information into the journal will cause unmatched totals. This is a warning that something is wrong and that the month's entries need to be checked. In the same way, when making entries to the expense journal, the GRAND TOTAL of the BANK WITHDRAWL and CASH PAID columns should be equal to the GRAN TOTAL of all the expense account columns.

A possible problem to deal with is when the income or expense journal for a month is full and you still have entries to make. There are two possible solutions. The easiest way is to save the full journal, clear the spreadsheet, load in a new "blank" journal and continue the month's entries on the new journal. This has the advantage that each journal stays the same size and is fairly small and easy to manage. The disadvantage is that producing the annual summaries will be more difficult.

The other solution is to move the bottom line of the journal down, creating room for more entries. If you do this, make sure to check the formulas which calculate the account and grand totals to insure that they remain correct.

FIGURE 2

```
INCOME AND OTHER INFLOW
JUNE
                      BANK       CASH                      *   LIVESTOCK INCOME        CROP INCOME                         OTHER       CAPITAL
DAY         REF #     DEPOSIT    RECEIVED   DESCRPTIVE NOTE*   BEEF        OTHER       WHEAT       BARLEY      OTHER       INCOME      SALES
June 13               4563       1257.75    0.00 Sold 430 bales*                                                           1257.75
```

For now, use the second method, as it will make producing the annual summaries easier. In future installments, we will show you a better way of handling this problem.

To finish this month's installment, here are examples of income and expense journals with several entries. Try making the same entries into your spreadsheets and see if you come up with the same numbers (see Figure 3). If you have a modem, these examples may be downloaded from our bulletin board system. Download files BWAS2A/VC and BWAS2B.VC.

FIGURE 3

```
EXPENSES AND OTHER OUTFLOW
JUNE
                              BANK           CASH                           *   LVSTK          LVSTK           CROP           MACH/BLDG      CAPITAL        OTHER          CAPITAL
DAY            REF #          WITHDRAWL      PAID            DESCRPTIVE NOTE*   PURCH.         SUPP/SERV       SUPP/SERV      EXPENSES       PURCHASES      EXPENSES       SALES
June 11                    276          16.85           0.00 Truck parts    *                                                           16.85
June 13                    277         335.09           0.00 UFA COOP       *                            23.64                         234.56                         76.89
June 15                                  0.00          12.34 Air filter     *                                                           12.34
June 15                    278          75.00           0.00 Salt           *                            75.00
June 20                    279           0.00           0.00 New haybine    *                                                                        5500.00
                                      3500.00           0.00  Payment       *
                                         0.00           0.00  Trade in      *                                                                                             -2000.00
June 23                                  0.00           3.50 Light bulbs    *                                                            3.50
June 23                    280         259.45           0.00 Calves         *            259.45
June 24                    281          24.78           0.00 Roundup        *                                           24.78
June 24                    282         145.45           0.00 Groceries      *                                                                                        145.45
                                                                            *
                                                                            *
                                                                            *
**********     **********     **********     **********     ****************************       **********     **********     **********     **********     **********      *********
               TOTALS ->              4356.62          15.84                             259.45          98.64          24.78         267.25        5500.00         222.34        -2000.00
               GRAND TOTAL ---                      4372.46                             4372.46
```

```
INCOME AND OTHER INFLOW
JUNE
                              BANK           CASH                           *   LIVESTOCK INCOME               CROP INCOME                                  OTHER          CAPITAL
DAY            REF #          DEPOSIT        RECEIVED        DESCRPTIVE NOTE*   BEEF           OTHER           WHEAT          BARLEY         OTHER          INCOME         SALES
June 13        4563                   1257.75           0.00 Sold 430 bales*                                                                         1257.75
June 15        D23323                 2345.67           0.00 Barley         *                                                         2345.67
June 16                                  0.00          35.00 Seed oats      *                                                                              35.00
June 20        JU876H592              1564.87           0.00 Sold cows      *           1564.87
June 20                               3000.00           0.00 Loan - haybine*                                                                                        3000.00
June 23        234                     200.00           0.00 Used drill     *                                                                                                  200.00
                                                                            *
                                                                            *
                                                                            *
                                                                            *
                                                                            *
**********     **********     **********     **********     *****************************    **********     **********      **********     **********     **********     *********
               TOTALS ->              8368.29          35.00                          1564.87           0.00           0.00        2345.67        1292.75        3000.00         200.00
               GRAND TOTAL ---                      8403.29                          8403.29
```

Now would also be a good time to start entering your transactions for this year into income and expense journals like the example. Make sure that you save each month's entries in a separate file (e.g. BWASJANE.VC, BWASJAN1.VC, BWASFEBE.VC, etc.) and that you do not erase your "blank" income and expense journals.

Next month we will look at how to produce the annual income and expense summaries from the monthly journals.

WHAT IS SMALLER THAN A BREADBOX, AND WEIGHS LESS THAN 15 LBS?

A "laptop" computer! Laptops are computers that you can carry with you just about anywhere, and even use on top of your lap. They are small, light and generally work from batteries. You could easily take one with you out to the squeeze chute and record weights and treatments immediately. While they may seem very attractive, consider these three major areas before purchasing:

DISPLAY DEVICE - instead of the now familiar CRT (a miniature TV), laptops use a flat display that is much smaller and lighter. They are generally LCDs (Liquid Crystal Displays) or Electro-illuminescent Displays. LCD's use very little power but can be a little difficult to read under any but the best conditions. Some manufacturers put little lights behind the LCD screen (backlit) to improve readability. Electro-illuminescent displays are very readable, but like backlit LCDs, their power consumption is higher.

BATTERY LIFE - dictates how long you can go between recharges. Some laptops don't even have batteries, which means you have to plug them in, but most will go for 2 to 10 hours on a single charge. The type of display device, and diskette drive used are the chief determining factors.

DISKETTE SIZE - can be either 5.25 inches or 3.5 inches. To be most useful, you should be able to transfer the disks from your laptop to your desktop computer. Most likely your desktop computer had 5.25 inch diskettes, but many laptop manufacturers have gone to 3.5 inch drives, since they have lower power consumption and higher data capacity. Evaluate the costs and troubles of data conversion.

VOLUME VII, NO. 5, JULY, 1986

Provides valuable information for Apple II users.

APPLEWORKS - INTEGRATED SOFTWARE FOR THE APPLE II SERIES

Appleworks is one of the better examples of integrated software on the market. Currently outselling LOTUS 123, this program offers a practical spreadsheet, a database handler, a word processor and a straight-forward working environment. Appleworks is powerful, easy to use and practical. It integrates the three functions that it offers very well.

Integration means that all of the functions of the program are linked together to make the program easier to use, and more versatile.

All of Appleworks' commands are the same for each section of the program. You don't have to learn different key strokes each time you change from a database to a spreadsheet. The manuals are clear and explain each function, and on-screen help is available if you need it while you're working. Beginners and occasional users find this a blessing. Experienced computer users take a minute or two to get the knack of using the desktop, then they jump right in.

Appleworks calls its working environment a "desktop". Take a look at your desk and you will find more than one piece of work there. For example, in a livestock operation you may have your herd records (database), some production indexes (spreadsheet) and a writing pad (word processor). You may be using all of these to accomplish the same job, perhaps in sending a list of sale animals to interested buyers. Appleworks allows you to have all of these bits of information, in fact up to 12 files, active "on your desktop" at once. Switching between files is as quick as it is simple. One keystroke from anywhere in the program will open a window on the screen. In the window are all the files you have on your desktop. Use the arrow keys to highlight the one you want and press return. Immediately, the new file appears on the screen and you're back at work. That's all it takes to go from spreadsheet to word processor. It's so easy it can become addicting!

You can take information with you when you switch files as well. Moving data seems to have been a priority when they developed Appleworks. Let's continue our livestock farm example. We're sending letters about bulls to potential clients. We've gone through our herd file (a database) and selected all bulls between 12 and 17 months of age indexing over 110 in our herd. Selection is menu driven, meaning we answer the questions Appleworks asks and it displays the selected animals on the screen. We'd like to include this information in our letters to clients, so we print the information to a special part of memory known as the "clipboard". This takes about two seconds. Then we hit a key to call the list of programs on the desktop and switch to our word processor file with our letter in it. Two more keystrokes and we copy the "clipboard" to our letter. The bull information is now part of our letter and error-free at that.

SPREADSHEET - The Appleworks spreadsheet is solid. All commands are offered in full word prompts across the bottom of the screen. All of the modern conveniences, save one, are offered such as variable column widths, sorting, searching, access to the clipboard and controllable printing features. The one glaring omission is natural recalculation. Appleworks' spreadsheet recalculates by row or by column the same as VisiCalc. It's fast, but I still miss the less demanding natural recalculation found in Multiplan or LOTUS 123.

Don't sell this spreadsheet short, though. It will get the job done quickly and easily. Recalculation is fast even when you get over 500k in spreadsheet size. (Yes, that was 500k). You can import information from ASCII or DIF files or directly from VisiCalc files. The entire spreadsheet covers 264 columns by 999 rows, and with enough memory, you can use it all.

DATABASE - While not relational, Appleworks has one of the friendliest database functions around. Back to our example; if we had calculated average daily gains and indexes on our bulls using the spreadsheet we could transfer this information to the database for long-term storage and to make life easier when we look for information on animals.

The process is simple. Print the spreadsheet information to a DIF file on the diskette. Start a new database program using the DIF file as a basis. Either work with the new file or use the clipboard to add the information onto an existing data file. Those are the steps and in reality, they don't take much longer to perform than they do to read. All are menu driven and no information needs to be retyped.

WORD PROCESSING - What you see is what you get! The current standards in word processing are followed, such as displaying the tab settings across the top of the screen, and your position in your document across the bottom. The word processor will handle variable formatting, bullets, headers, footers, page numbering and special printer features like proportional print. Missing are true footnotes and indexing functions, but not many farm applications will miss those.

INDUSTRY SUPPORT - You know a program has arrived when a variety of companies put out utility software to support or enhance it. Appleworks has an entire list ranging from graphics packages to mail merge programs; from spelling checkers to font enhancing packages. There are even co-resident programs that offer calculators, note pads, communications, appointment calendars and spelling checkers that are available at a keystroke without interfering with Appleworks.

There's exciting hardware out there, too! Since Apple Computers issued a standard for large scale memory expansion, there are a variety of memory expansion options for the Apple II series that make Appleworks shine. The leader of the pack for the IIe computer is Applied Engineering's RAMWORKS card expandable from 256k to 16000k. That's right, 16 megabytes! There's even a new card called RAMFACTOR, that can adapt Appleworks to the antique Apple II+ and give memory to spare. More on that next month.

In all, Appleworks is a class act that will be hard to follow. Information processing is straightforward and easily adapted to farm uses. The best news is that once you master one part of the Appleworks program, say the spreadsheet, the rest is easy because commands and practices are the same throughout. Not everyone needs relational databases or true footnotes on their letters. Appleworks really is integrated software "for the rest of us"!

Provides some good instructions and again shows how easy it is to access the RBBS.

THE COMPU-FARM BULLETIN AND THE "ARC" UTILITY

Lately, we have been using a utility on our RBBS named "ARC.EXE", from System Enhancement Associates of Clifton, New Jersey. ARC creates and maintains groups of files in an "ARChive", in such a way that the individual files can be recovered intact. There are two main benefits to using this program: 1) files are compressed by up to 50% from their original size, and 2) it combines several related files into one. The main reason for using this utility is that it substantially reduces the amount of time required to download files and, therefore, reduces telephone charges.

An example of this benefit can be seen by looking at the file STRIKER.ARC which is on our RBBS. The ARC file is 70016 bytes but actually contains 9 different files which would occupy 138845 bytes if not ARCed. This reduces the time to download from 35 minutes to 15 minutes at a 1200 bps transmission rate.

This means that you must download the files ARC.EXE and ARC.DOC from our RBBS before you can unARChive files. ARC is not very difficult to use, and there is really only one command that you are likely to need to unARChive files. With our example, STRIKER.ARC, the command would be:

```
ARC E STRIKER.ARC *.*
```

This command tells ARC to Extract ALL (*.*) files from the STRIKER.ARC file. What you would find on your disk after it was finished would be the following files:

```
Name          Length   Date
============  ======== =========
HIGHSCOR.DAT       512  1 Jan 80
MISFAC.DAT        1536  1 Jan 80
READ.ME             92  1 Jan 80
STRIKER.DOC      13519  1 Jan 80
STRIKER.EXE      67285  1 Jan 80
STRKHINS.BAT        93  1 Jan 80
STRKLOGO.DAT      6144  1 Jan 80
STRKPARM.DAT       512  1 Jan 80
TUNNELS.DAT      49152  1 Jan 80
             ====   ========
Total          9     138845
```

That is certainly easier and quicker than downloading all 9 files and having to type in each of their names properly!

ARC is a SHAREWARE program, which means that it is not quite free, but almost. System Enhancement Associates gives permission to use and copy it freely, provided that no fee is charged, it is distributed as a complete set of files (2), and it is not modified. If you are using ARC and find it to be of value, the authors request a voluntary contribution. Nice people! Good utility!

BOOKKEEPING WITH A SPREADSHEET

It's time to start project #2 of the Bookkeeping With A Spreadsheet series. Last month's installment finished the first project where you learned to use the simple templates provided in the April issue of Compu-Farm to produce the monthly journals. This month, you will begin working with Lotus 123 worksheets and learn how to produce the annual summaries.

If you haven't already, take a look at the April and

June issues of Compu-Farm for the first and second installments of the BWAS project. You will need to understand what was done in those installments before you can continue with the second project.

Project #2 will use the Lotus 123 spreadsheet program. If we are going to make our spreadsheet bookkeeping system more sophisticated, we need a spreadsheet which provides us with more features than a simple first-generation product like VisiCalc provides. We have chosen to use 123 since it is the most popular spreadsheet among IBM standard computer users, who make up the majority of Compu-Farm readers. We will, however, describe the methods used in general terms so that they may be applied to any spreadsheet program that has similar capabilities.

Figure 1 shows the income journal from last month, converted for use with the 123 spreadsheet. (This file and a converted expense journal may be downloaded from our bulletin board - download BWAS3A.WKS and BWAS3B.WKS.) We have taken advantage of some of the features of the 123 program to make the templates more readable. The templates will still work if you don't make these cosmetic changes, but here's a description of the changes for those interested:

- With the Lotus 123 spreadsheet, you can independently set the width of each column. This allows you to insert additional columns into the original spreadsheet which are used to produce the vertical dividing lines. By setting the width of these new columns to 1 and then copying appropriate characters into them, you can divide your templates making them more readable.

- The Date column width has been set to 9, and the Descriptive note column width has been set to 30 to make more efficient use of space.

- Additional rows have been inserted to provide horizontal dividing lines.

- We have used the extensive formatting capabilities of 123 to make the templates more readable. The global default format has been set to currency. The global default format describes how the contents of spreadsheet cells will be displayed if we do not explicitly tell the spreadsheet how we want a cell to be formatted. In this case, all numbers will be formatted as currency unless we specify otherwise (i.e. a leading dollar sign will be added, commas will be inserted where appropriate, etc.). The Reference and Descriptive note column formats have been set to general, so that any numbers entered into these columns do not look like monetary values.

Now take a look at the income and expense summaries. These templates haven't been used yet, so you may need to go back to the first installment and type them in. Figure 2 shows the income summary template converted to Lotus 123.

One substantial change has been made to these templates. The four left-most columns from the original template (the columns that were headed DAY, REF #, BANK WITHDRAWL, and CASH PAID) have been eliminated. These columns were originally included for compatibility with the "Income and Expenses, Basic Records for Alberta Farmers" account book, but are no longer needed. The other changes are cosmetic. (These templates may also be downloaded - files BWAS3C.WKS and BWAS3D.WKS.)

Now, let's consider how to produce the summary from the monthly journals. The simplest way would be to print each month's journals, then manually enter the account totals from each month into the appropriate space on the summary, exactly the same way you would do it if you were keeping manual records. It would probably be a good idea to check out the Income and Expense summaries in "Income and Expenses, Basic Records for Alberta Farmers" account book to see how this is done.

Preparing the summary this way doesn't take advantage of the computer's ability to easily manipulate information. What you want to be able to do is automatically transfer the account totals for a month to the summary sheet in one step. The easiest way to do this with Lotus 123 is to use a Named Range with the File Combine functions.

The Named Range facility in Lotus 123 lets you assign a name to a group of cells. This is a little-understood function which is very useful in many areas of spreadsheet work. For your project, you want to apply a range name to the group of cells which contain the account totals for each month. You will want to do this for each monthly Income and Expense journal that you want to take the monthly account totals from, and in the "blank" templates which are copied when starting the new Income and Expense journals each month.

First, load one of the income or expense journals. To apply a Range Name to the cells which contain the monthly account totals, move the spreadsheet cursor to the upper left corner of the block of cells you want to name (see Figure 1). Enter the command "/RNC" (for / Range Name Create). The program will prompt you to "Enter name:". Enter the name "totals", and hit the return key. Now, move your cursor to the last cell in the range you want to name and hit the return key. Save the template. You can load in the next income or expense journal to be done and repeat the process.

Once you have named the range of cells which contain the monthly account totals in each Income and Expense journal, you can then automatically insert these numbers into the appropriate annual summary using the File Combine function.

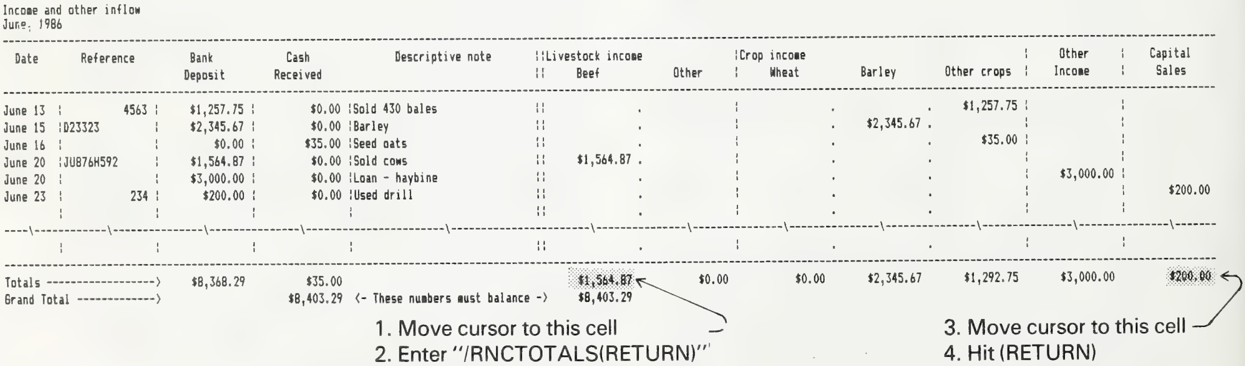
For example, add the June income account totals to the income summary. Load in the blank annual income summary template (file BWAS3A.WKS). Move your cursor to the cell in the furthest left income account column which is directly opposite the month for which you want to enter the figure (see Figure 2). Now enter the command "/FCAN" (for / File Combine Add Named). This tells the spreadsheet that you want it to go to another template, take the values of the cells in the named range, and add them to a series of cells in the current template.

The program will now prompt "Enter range name:". Type in the range name "totals" and hit return. The program will then prompt for a file name to combine. By either typing in the name or using the cursor keys, specify the file which contains the income journal for the month you want to take the account totals from. (If you are using the recommended method of naming files, it would be BWASJUNI.WKS if you want the June income account totals.) After a few seconds, the spreadsheet should finish calculating and the account totals from the specified month will be entered into your summary template. Figure 3 shows what the summary should look like after transferring the account totals from the June Income journal.

Similar facilities for combining parts of different templates are provided with all spreadsheets. In cases where a feature similar to range names is not provided, it may be necessary to go into each month's journal and copy the portion of the spreadsheet that contains the monthly account totals into a temporary file, then return to the summary template and copy the temporary file into the appropriate place in the summary. Look in the documentation for your spreadsheet under "combining files".

If you are using Lotus 123, producing the annual summary with this method provides a simpler way of handling the problem of not enough room in a monthly journal. Because you are adding the monthly totals to the numbers already in the summary, rather than replacing them, you can easily add the totals from several journal templates to one month's entry in the summary. If you run out of room in a journal, simply save the template, load in a new "blank" journal, and continue making entries. Then, at the end of the year, repeat the process of making the entries to the summary as often as necessary for each month, which will automatically total all of the journals for each month. This has the advantage that each journal will be exactly the same size, simplifying the printing and filing of the journals. It also prevents us ever having to modify the journal, avoiding the possibility of introducing errors.

Next month, we will show how to automate these operations further, using the macro facilities of 123.

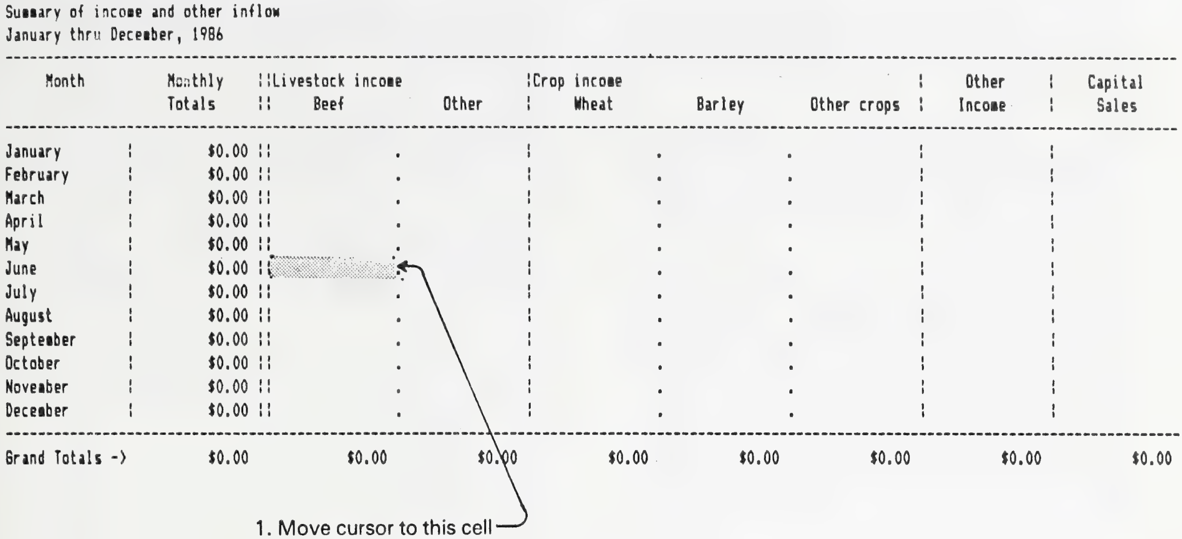


```
Income and other inflow
June, 1986
------------------------------------------------------------------------------------------------------------------------------------------------
 Date      Reference       Bank         Cash          Descriptive note      ||Livestock income               |Crop income                                 |   Other    |   Capital
                          Deposit      Received                             ||     Beef          Other       |    Wheat        Barley        Other crops  |   Income   |    Sales
------------------------------------------------------------------------------------------------------------------------------------------------
June 13 |        4563 |  $1,257.75 |      $0.00 |Sold 430 bales             ||                 .             |                .             .   $1,257.75 |            |
June 15 |D23323       |  $2,345.67 |      $0.00 |Barley                     ||                 .             |                .   $2,345.67 .             |            |
June 16 |             |      $0.00 |     $35.00 |Seed oats                  ||                 .             |                .             .      $35.00 |            |
June 20 |JU876H592    |  $1,564.87 |      $0.00 |Sold cows                  ||      $1,564.87 .             |                .             .             |            |
June 20 |             |  $3,000.00 |      $0.00 |Loan - haybine             ||                 .             |                .             .             |  $3,000.00 |
June 23 |         234 |    $200.00 |      $0.00 |Used drill                 ||                 .             |                .             .             |            |    $200.00
        |             |            |            |                           ||                 .             |                .             .             |            |
----\------------\---------------\---------------\----------------------\----------------------\---------------\---------------\---------------\---------------\---------------\---------------\-------
        |             |            |            |                           ||                 .             |                .             .             |            |
------------------------------------------------------------------------------------------------------------------------------------------------
Totals ------------------>  $8,368.29      $35.00                                  $1,564.87        $0.00          $0.00     $2,345.67     $1,292.75     $3,000.00      $200.00
Grand Total ------------->              $8,403.29  <- These numbers must balance ->  $8,403.29
```

1. Move cursor to this cell
2. Enter "/RNCTOTALS(RETURN)"

3. Move cursor to this cell
4. Hit (RETURN)

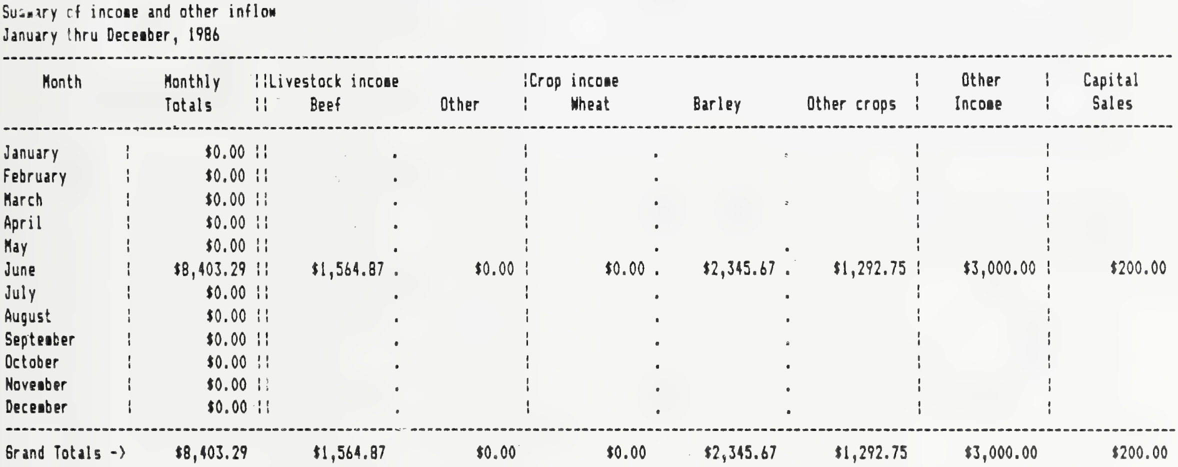
FIGURE 1: ADDING A RANGE NAME TO A JOURNAL TEMPLATE



```
Summary of income and other inflow
January thru December, 1986
------------------------------------------------------------------------------------------------------------------
   Month        Monthly  ::Livestock income          :Crop income                              :  Other   :  Capital
                Totals   ::    Beef          Other   :    Wheat        Barley      Other crops :  Income  :   Sales
------------------------------------------------------------------------------------------------------------------
January      :    $0.00 ::            .              :           .            .                :          :
February     :    $0.00 ::            .              :           .            .                :          :
March        :    $0.00 ::            .              :           .            .                :          :
April        :    $0.00 ::            .              :           .            .                :          :
May          :    $0.00 ::            .              :           .            .                :          :
June         :    $0.00 ::            .              :           .            .                :          :
July         :    $0.00 ::            .              :           .            .                :          :
August       :    $0.00 ::            .              :           .            .                :          :
September    :    $0.00 ::            .              :           .            .                :          :
October      :    $0.00 ::            .              :           .            .                :          :
November     :    $0.00 ::            .              :           .            .                :          :
December     :    $0.00 ::            .              :           .            .                :          :
------------------------------------------------------------------------------------------------------------------
Grand Totals ->   $0.00         $0.00        $0.00         $0.00        $0.00        $0.00        $0.00       $0.00
```

1. Move cursor to this cell
2. Enter "/FCANTOTALS"
3. Indicate the name of the file you want to load totals from

FIGURE 2: ENTERING JUNE ACCOUNT TOTALS TO THE SUMMARY



```
Summary of income and other inflow
January thru December, 1986
------------------------------------------------------------------------------------------------------------------
   Month        Monthly  ::Livestock income          :Crop income                              :  Other    :  Capital
                Totals   ::    Beef          Other   :    Wheat        Barley      Other crops :  Income   :   Sales
------------------------------------------------------------------------------------------------------------------
January      :    $0.00 ::            .              :           .                             :           :
February     :    $0.00 ::            .              :           .                             :           :
March        :    $0.00 ::            .              :           .                             :           :
April        :    $0.00 ::            .              :           .                             :           :
May          :    $0.00 ::            .              :           .            .                :           :
June         :$8,403.29 ::   $1,564.87 .      $0.00  :      $0.00 .   $2,345.67 .   $1,292.75  : $3,000.00 :   $200.00
July         :    $0.00 ::            .              :           .            .                :           :
August       :    $0.00 ::            .              :           .            .                :           :
September    :    $0.00 ::            .              :           .            .                :           :
October      :    $0.00 ::            .              :           .            .                :           :
November     :    $0.00 ::            .              :           .            .                :           :
December     :    $0.00 ::            .              :           .            .                :           :
------------------------------------------------------------------------------------------------------------------
Grand Totals -> $8,403.29   $1,564.87       $0.00        $0.00   $2,345.67   $1,292.75   $3,000.00     $200.00
```

FIGURE 3: COMPLETED ACCOUNT TOTALS ENTRY FOR JUNE

RAM FACTOR MEMORY EXPANSION CARD

With the announcement last fall of Apple Computer's belated (and much needed) memory expansion card, the Apple II series of computers got a real boost. This move gave the industry specifications for a standardized RAM expansion interface for both hardware and software developers. It also moved the Apple II into the '80s as a contender for the business user market.

Apple's Memory Card is a plain vanilla version of the expansion Cards now flooding the market. It has 256k of RAM on the card and will fit any slot in the motherboard of an Apple II, except slot 0. With a piggyback card, it can be expanded to one megabyte (1000k) of RAM.

While this card is a departure from the usual bank-switching methods of older RAM expansion cards, it is not continuous memory within the computer. In other words, it takes a special program or operating system to recognize the card. Appleworks is the number one example to make use of the extra memory for its files and desktop. Other programs like Jeeves and Pinpoint are just beginning to take advantage of the new power and more will be announced in the next few months.

Beyond Apple's card is Applied Engineering's RAMFACTOR card. This card offers expansion to one megabyte right on the card itself. With a piggyback

card, it can be expanded to 16 megabytes. It also has a 16 bit processor option and a battery backup system available.
it's even priced competitively with other RAM expansion cards.

Most of RAMFACTOR's marketing is aimed at the Appleworks user. The card comes with a special disk that can "upgrade" your copy of Appleworks to take special advantage of the extra memory. In testing the one megabyte version of the card, several advantages stand out.

First, the upgrade loads the entire Appleworks system into the upper regions of the expanded memory. This works like a RAM-disk for the program and speeds the operation up considerably. There are very few pauses to access the master diskette, the main exception being the print routines. Loading Appleworks into memory doesn't affect your desktop space either. The routines in memory are "bumped" if you need the desktop space, and the program accesses them from the diskette as it would normally.

The second advantage is, of course, the luxury of having 1012k of desktop. This is in an Apple II+, so a IIe or a computer equipped with Applied Engineering's Transwarp Accelerator card will actually have more space than that without resorting to the piggyback expansion. While you are still limited to a maximum of 12 files open at one time on the desktop, the size of the files is expanded. In the spreadsheet, you can use the full 264 columns by 999 rows. I tried it out and found that it used 749k. Try that in your PC! The word processor is expanded to 5100 lines and the database is allowed 5100 records per file.

The third noteworthy advantage is the ability to use Appleworks on an Apple II+. The upgrade program will modify Appleworks to use a II+, and a Videx compatible 80 column display card. This gives you a very workable version of Appleworks on your antique II+, and as yet, I haven't found any shortcomings in its operation. The one thing I would change would be the "delete" key. Since the II+ doesn't have a delete key, the modified Appleworks uses ESC shift-3 or ESC # for a delete key and it is a bit inconvenient.

Something else worth noting is the ability to partition the memory into as many as nine banks. Bank #1 could be Appleworks, bank #2 could be DOS 3.3, bank #4 could be a copy utility, and bank #5 could be CP/M if you wanted. You can switch from bank to bank with just a few keystrokes using a controlling program built into the hardware of the card. It is very much like having half a dozen disks instantly on call, and it works quite well.

There are other advantages, like automatic partitioning of files that are too large for storage on a single diskette, but there are a few disadvantages, too. My poor old II+ has all its slots filled with nifty cards and the addition of one megabyte of RAM was too much for its elderly power supply. No damage done, however, I removed a couple of unused cards and everything worked fine. The alternate cure would be a more powerful supply that could feed all of those hungry cards at once.

Another gremlin in the works is the RAM disk functions under DOS 3.3. The RAM disk is a phantom disk drive in the RAM card when the card is not used by some other program. I've had a few problems with the file transfer utilities moving data from the RAM disk to the real disk. When given the command to "copy all files" from the RAM disk, sometimes it will copy the files several times each. The problem seems to have sorted itself but, but it was a nuisance. The Prodos version of the RAM disk is not nearly as temperamental and is reliable.

To put the card to use right away, I rewrote the "Hello" program on my accounting disk. Upon booting, the entire accounting program is moved to RAM disk 1, and my accounting data is parked on RAM disk 2. From there on, the computer accesses RAM instead of diskettes and has speeded up the process by about 100%. Start-up is slower, and shut down is slower as all the information on RAM drive 2 must be stored on diskette. The payoff is the dramatic increase in speed while the program is running! There is a risk of losing information in the case of power failure, and it is amplified by having all the latest data in RAM. Save your data frequently and there is little problem.

Don't confuse RAMFACTOR with RAMWORKS. RAMWORKS is a special card for the Apple IIe auxiliary slot. Its purpose in life is to amplify Appleworks and it does it very well. By comparison, RAMFACTOR will fit in any of the back slots of the II+ or IIe computers or compatibles. It works with a broader variety of software than RAMWORKS and has much of its support software built in. In either case, the investment is considerable, $300 to $500 Canadian. It is indispensable for the use of Appleworks on the II+, without it you have only 10k of workspace! In testing, the RAMFACTOR works well as both memory expansion and RAM disk. And it does give the Apple II a sizable desktop!

BOOKKEEPING WITH A SPREADSHEET

In last month's installment of the Bookkeeping With A Spreadsheet project we converted our templates to work the Lotus 123 spread sheet program and learned how to produce the annual income and expense summaries. We also looked at how to use range names to automate the entry of information to the account summaries.

This month we will complete the second project of Bookkeeping With A Spreadsheet. You will learn how to use macros to further automate the operation of your spreadsheet accounting system, and learn how to produce a balance sheet.

Macros are one of the most commonly available and powerful features of spreadsheet programs. For this example we will refer to the specifics of the 123 program, but the same concepts and methods will apply to other spread sheet programs.

In the 123 reference manual, macros are called "the typing alternative", which is an easy way to remember what macros are used for. Macros let you record frequently used combinations of keys right in the 123 spreadsheet itself, where they can be used at any time just as if they had been typed in at the keyboard. If you find that you are constantly repeating the same steps over and over again with your spreadsheet then a macro is probably what you need.

As an example, here is a very simple example macro for you to try. Start up the 123 program with a blank template. In cell A1, enter the following label:

```
   '{right}{down}{down}{left}
```

(Make sure you start the label with the single quote, otherwise 123 may get confused and try to execute what you type in as a command, rather than put it into a spread sheet cell.)

Now we need to create a range name which indicates to 123 where the macro we want to use is located. Move your cursor to cell A1, and enter the command:

```
'/RNC\A<return><return>
```
(Which stands for: / Range Name Create \A)

Range names that begin with the backwards slash character (ie. "\") have the special purpose in 123 to signify that the range name identifies a macro, which should be executed whenever the Alt key is pressed along with the character which follows the slash. To execute the macro which has been given the name "\A", press and hold down the Alt key, then press the letter A. The cursor, wherever it is on the screen, should move right one cell, down two cells, and back one cell to the left, ending up two cells below where it started.

Each time you press Alt-A, the 123 program goes to the cell which has the name "\A" and looks to see what is in the cell. If the cell has a label in it, it reads the label, one character at a time, and uses it as if you had typed it in at the keyboard. Entries in the macro which are enclosed in curly brackets are treated specially. Each item enclosed in curly brackets is treated as one key for which a standard one key symbol is not available. For example, the entry {right} is a macro and is the same as pressing the right cursor key once. That is why the macro "{right}{down}{left}{up}" causes the cursor to make a small loop. More information on using macros is available in the reference manual for the spread sheet you are using.

We can use macros to automate the production of the annual income summary. If you have set up your accounting system as suggested, the account totals for each month in the income and expense journals have been given the range name "TOTALS". Each income journal is stored in a separate worksheet with the name "BWASJANI.WKS" for January's income, "BWASFEBI.WKS" for February's income, and so on for "BWASMARI.WKS, "BWASAPRI.WKS", etc.

To begin, load in a blank copy of the income summary. You will need to decide where on the template you are going to keep the macros that have to be defined. I would suggest putting them below the current template, just down far enough so that they do not normally appear when working with the income summary. If you are using the example template from last month, this would be cell A23.

The first thing you will have to do is apply a range name to the cell where you want the macro execution to begin. Place the cursor on cell A23, enter the command "/RNC\G" (/ Range Name Create \G) and press <return>.

Now begin entering the macro that you intend to use. The first line of the macro should be reserved for commands needed to initialize the template so that the rest of the macro will work correctly. The only command which should be needed is one to move the cursor to the first line where account totals will have to be entered:

```
      '{GOTO}C7~
```

This macro will place the cursor so that we are ready to read in the account totals for January. Now move down one row to cell A24 and enter the command needed to read in the account totals for a month:

```
      '/FCANTOTALS~
```

Make sure that when you enter this label you start it with a single quote, otherwise the 123 program has no way to know that you want to place the string "/FCANTOTALS~" in cell A24 and will actually try to import the account totals as you type it in. The tilde character (ie. "~") is the symbol used in 123 macros for the <return> key.

In the next cell down (cell A25) enter a label which contains the name of the income journal that you want to import account totals from, followed by a titled character. To import January's account totals, the entry would be:

```
      'BWASJANI~
```

To import the account totals for February, you will want to move the cursor down one cell, and then import the totals from the file "BWASFEBI". The macros required to do this should be entered into cells A26 and A27, and are:

```
      'BWASFEBI
```

Continue on for the months March through December. Note the command required to import the account totals for each month will stay the same, and may be simply copied from one month to the next. Only the file name needs to be changed. The final macro to produce the income summary for the first six months should look like this:

```
{GOTO}C7~
'/FCANTOTALS~
BWASJANI.WKS~
{DOWN}/FCANTOTALS~
BWASFEBI.WKS~
{DOWN}/FCANTOTALS~
BWASMARI.WKS~
{DOWN}/FCANTOTALS~
BWASAPRI.WKS~
{DOWN}/FCANTOTALS~
BWASMAYI.WKS~
{DOWN}/FCANTOTALS~
BWASJUNI.WKS
```

Once the macro has been entered, pressing Alt-G will automatically add the account totals from all of the income journals to the income summary for the year. Note that the totals from each month do not replace any entries currently in the income summary but are added to any entries already there. This way you can use as many journals as you like in any one month and still easily prepare the account summary. For example, you could use a separate journal each month for your cattle enterprise, grain enterprise and overhead. Then at the end of the year you could produce individual annual summaries for each enterprise and the overall farm, using basically the same template. However, you do have to be careful with this method that you have set all of the cells in the summary equal to zero before you start adding new entries.

One possible addition to this set of macros would be an initialization sequence which clears out any entries already in the summary. (A set of income and expense summary templates, complete with macros to initialize and print the summaries automatically, is available from our bulletin board. Download BWAS4A.WKS and BWAS4B.WKS.)

Taken together, the income and expense summaries form the equivalent of a cash basis profit and loss statement. The profit and loss statement lets you know whether there was more sold than spent last year and gives you the information required to file an income tax return. However, you are still missing an important part of any basic accounting system - a balance sheet. The balance sheet shows you what the true profitability of the farm is, taking into consideration the effects of changes in inventory and changes in the value of assets.

You cannot produce a balance sheet from the income and expense journals; you need to have information that is not available from them. Figure 1 shows a typical balance sheet for a farm operation like the one used in our example accounting system. (A template to prepare this balance sheet may be downloaded from our bulletin board. Download file BWAS4C.WKS.)

Most of the information on this balance sheet will have to be collected from other sources, by taking inventories of what grain and feed is in storage, checking up on account balances, inquiring with creditors and debtors, and estimating the values of land, buildings, etc. More information on completing balance sheets is available from the "Income and Expenses, Basic Records for Alberta Farmers" account book available from your D.A.

Some of the things that you want to look for in your completed balance sheet are:

- Did the owner's equity go up or down? It is quite possible that the income statement is showing a profit being made, while the owner's equity is declining. If this happens the profit probably results from produce being sold that was produced in previous years, so that in the current year you received all of the income from the product but incurred none of the expenses. Similarly, it is important to note that if a loss occurred in the current year, animals or produce on hand ready for sale may improve the owner's equity and should provide income in following years.

- The net capital ratio of a business is calculated by taking the total assets owned by the operation and dividing it by the total liabilities. If the resulting number is less than one, then the business is insolvent because it owes more to its creditors than what its assets are worth. If the net capital ratio is equal to or slightly greater than one, then the business is still viable but must be watched carefully. A net capital ratio of two or greater is considered to be the preferred situation for most businesses.

For more help on preparing a balance sheet and using the information it contains, see "Determining Your Financial Position with a Balance Sheet", Agdex 818-30, available from Alberta Agriculture.

This finishes up the second part of the Bookkeeping With A Spreadsheet project. Next month, we will talk about some of the things which are wrong with the system that has been developed and decide what tools will be needed to improve it.

```
Comparative Balance Sheet for 1986
------------------------------------------------------------------------------------------
              Farm Assets          :   Beginning    :          End
                                   :    of Year     :        of Year
------------------------------------------------------------------------------------------
CURRENT ASSETS
   Farm Cash                                $0.00   :       $0.00
   Grain and Roughage                       $0.00   :       $0.00
   Market Livestock                         $0.00   :       $0.00
   Farm Supplies                            $0.00   :       $0.00
   Current Accounts and Receivables         $0.00   :       $0.00
                              --------------------------------------------
TOTAL CURRENT ASSETS                        $0.00   :       $0.00

INTERMEDIATE ASSETS
   Machinery                                $0.00   :       $0.00
   Breeding Livestock                       $0.00   :       $0.00
   Intermediate Accounts and Receivables    $0.00   :       $0.00
   Other                                    $0.00   :       $0.00
                                               -------------------------------------------
TOTAL INTERMEDIATE ASSETS                   $0.00   :       $0.00

FIXED ASSETS
   Land Owned                               $0.00   :       $0.00
   Buildings and Improvements               $0.00   :       $0.00
   Fixed Accounts and Receivables           $0.00   :       $0.00
                              ------------------------------------------
TOTAL FIXED ASSETS                          $0.00   :       $0.00

TOTAL FARM ASSETS                           $0.00   :       $0.00
------------------------------------------------------------------------------------------
              Farm Liabilities          Beginning    :       End
                                         of Year     :     of Year
------------------------------------------------------------------------------------------
CURRENT LIABILITIES
   Accounts Payable and Short Term Loans    $0.00   :       $0.00
   Accrued Interest                         $0.00   :       $0.00
   Arrears Principal Due                    $0.00   :       $0.00
   Intermediate Principal Due This Year     $0.00   :       $0.00
   Fixed Principal Due This Year            $0.00   :       $0.00
                              --------------------------------------------
TOTAL CURRENT LIABILITIES                   $0.00   :       $0.00

INTERMEDIATE LIABILITIES
   Livestock Loans                          $0.00   :       $0.00
   Machinery Loans                          $0.00   :       $0.00
   Other                                    $0.00   :       $0.00
                              -------------------------------------------
TOTAL INTERMEDIATE LIABILITES               $0.00   :       $0.00

FIXED LIABILITIES
   Land Loans                               $0.00   :       $0.00
   Building Loans                           $0.00   :       $0.00
   Other                                    $0.00   :       $0.00
                              --------------------------------------------
TOTAL FIXED LIABILITIES                     $0.00   :       $0.00

TOTAL FARM LIABILITIES                      $0.00   :       $0.00
------------------------------------------------------------------------------------------
OWNERS EQUITY:                              $0.00   :       $0.00

Net Capital Ratio: (total assets/total liabilities)           0.0
Debt Equity Ratio: (total liabilities/owner's equity)         0.0
Current Ratio: (current assets/current liabilities)           0.0
Working Capital Ratio:    (non- fixed assets)
                        -------------------------
                         (non-fixed liabilities)              0.0
```

FIGURE 1: TYPICAL FARM BALANCE SHEET

Shows the consumer that price is not necessarily the determining factor in making a purchase. Provides more questions for the consumer checklist.

BUYING COMPUTER HARDWARE

Once you have made the decision to purchase a computer and have decided what type you are going to buy (Apple or compatible, IBM or compatible, Commodore, etc.), you still have two more decisions to make - where to buy, and whether to buy a "name brand" or a compatible. Your best option depends on what type of person you are and what things you are willing and able to do for yourself. Let's examine some of the options, and see the benefits and hazards of each:

FULL SERVICE AGRICULTURAL DEALER - These dealers are probably the best equipped to provide good service to the agricultural community. They have an inside knowledge of the needs of agriculture, and will usually supply a one-stop hardware and program source. They take a full part in helping you set up your equipment and programs, and will even come out to your farm for one or two days to teach you how to use the computer and the software. All these services are costly to the dealer though, so their prices tend to be higher to cover this extra cost.

THE FULL SERVICE NON-AGRICULTURAL DEALER - These dealers have a good knowledge of their products, and often provide some set up and training, but usually only at their place of business, not yours. The overhead involved with providing a showroom where you can try out the computer, a salesman who will help you to determine your needs, and a shop that will set the machine up to your custom order, dictates that their prices are higher. They seldom have staff with knowledge of agricultural needs.

GENERAL RETAILER - These dealers sell more than just computers, but still have showrooms (or at least floor space) where you can sit down, try the computers, and talk to a salesman to determine your needs. They do not usually have as much expertise in computers as the previous dealers and seldom have any agricultural expertise.

DISCOUNT HOUSE - These dealers usually deal in high volumes. Price discounts can be significant, but if you are only buying one computer system, don't expect much in the way of help from a salesman. They will have no agricultural knowledge, so this is a place to buy only if you already know what you want, and expect no service from the dealer. They generally will provide on-site repair service.

MAIL ORDER - These dealers offer the lowest prices, with no service of any kind. You must know exactly what you want ahead of time, and expect nothing but "a box in the mail" from them. Repair service is the same as their delivery service - by mail - so expect some delays.

THE MACHINE - The next decision involves whether to purchase an "industry standard" or a compatible. No matter which way you decide to go, make sure the following things are included in your purchase:

1) SOFTWARE - Every computer that has diskette drives needs a Disk Operating System (DOS). Make sure that your purchase includes an original DOS; not just a copy that the dealer has made. It is important that the original disk is there, to prove that you have a valid licence to use the DOS. You should also make sure that a BASIC interpreter is included on an original disk, and that version of BASIC will actually run on your machine. Unfortunately, some dealers simply make illegal copies of the disks and distribute them to unsuspecting purchasers. This could leave you liable for copyright violation.

2) MANUALS - At a minimum, your computer purchase should include a DOS manual, a BASIC manual and a Hardware manual. Any legitimate DOS and BASIC will also come with manuals. You may need the BASIC manual if you want to program in BASIC or as a reference for some programs you purchase. Many compatibles do not include the BASIC manual simply because they do not have a valid licence to distribute BASIC. You need the hardware manual if you ever want to add options and need information on how to set switches, etc. If you have paid for a legal right to use the software and hardware, it should be accompanied by the proper manuals. If you don't get these manuals, you should be suspicious.

3) GUARANTEES AND REPAIR SERVICE - What guarantees and repair service is available? Most machines now come with at least a one year guarantee, but what good is that if the dealer isn't around anymore? Large, well-known companies, and smaller companies that have made arrangements with national service companies such as Xerox, give you a better assurance of continuing service two or three years from now.

SUMMARY - One of the obvious reasons for purchasing a compatible computer by mail order is the low purchase price. Just remember, paying less probably means you get less. Don't expect discount dealers to offer the same services as the full service agricultural dealers, any more than you would expect full service agricultural dealers to offer low prices. Each of them offers a different product and service.

USER SUPPORTED SOFTWARE - AN HONEST CONCEPT

You may have heard that you can get some FREE programs from us (PROCOMM, PC WRITE, PC-FILE, ADA BASIC, ADA 123 TEMPLATES, THE FINANCE MANAGER, etc.). The FREE part is not exactly true, since some of these programs are distributed with certain limitations on their use and distribution. To illustrate this concept, here's a little story:

Imagine that after months and months of work, YOU have developed an application that you are convinced others can use. On one hand, you want others to gain the benefits of using your program, but on the other hand, you want to get some return on your work. You decide that the normal commercial route is not acceptable. Too much marketing is involved and this would only push the price of your program up. But there are other ways! Remote bulletin boards, users groups, other users, etc. can be a very effective conduit for your wares. All you have to do is let people copy your program and use it. Let them know that if they use it and if it is of value to them, they can send you a small amount of money. The cost to them is much lower than what it would be through commercial channels. LET THEM WORK ON THE HONOUR SYSTEM! What a keen idea!

In fact, it is such a keen idea that the "User Supported" software market has many excellent programs, going under names such as FREEWARE, SHAREWARE, BUTTONWARE, TRYWARE, USER SUPPORTED, EVALUATION COPY, and PUBLIC DOMAIN. What do all these words mean?

PUBLIC DOMAIN - is software that has been donated to the public good. The author expects nothing from anyone for the use of the software, and the software can be altered in any way desired. It really is FREE! Obviously, this is no way to run a business, yet each year many thousands of programs are put into the public domain. Since you feel your time is worth something, you decide against this option.

FREEWARE - originally started around 1980 with a telecommunications program called PC-TALK, written by Andrew Fluegelman. "FREEWARE is an experiment in distributing computer programs, based on three principles:

> "1) The value and utility of software is best assessed by the user on his/her own system. Only after using a program can one really determine whether it serves personal applications, needs, and tastes.
>
> "2) The creation of independent personal computer software can and should be supported by the computing community.
>
> "3) Copying and networking of programs should be encouraged, rather than restricted. The ease with which software can be distributed outside traditional commercial channels reflects the strength, rather than the weakness, of electronic information.

"Such a program carries a notice suggesting a contribution to the program's author. Making a contribution is completely voluntary on the part of the user. Regardless of whether a contribution is made, the user is encouraged to copy and share the program with others. Payment for use is discretionary on the part of each subsequent user."

Now, this sounds good, but you are not sure that you can really trust people to send in money on a completely voluntary basis. After all, remember those copies of PC-TALK and THE FINANCE MANAGER that you have around but haven't paid for?

SHAREWARE, BUTTONWARE, TRYWARE, EVALUATION COPY - Such an open policy for voluntary payment is too trusting for some authors. You could alter the concept so that payment is required on a TRUST basis if people continue to use the program. This is a subtle difference since payment is REQUIRED to continue using the program after a trial period. To further encourage payment, some authors leave out portions of the manual, or provide disabled versions of the software for evaluation. Once a person registers and pays for the program, they receive full printed manuals and full working versions of the software. In our story, this option sounds like a safer marketing method to you.

USER SUPPORTED - There does not seem to be a single definition for this type of software, since each author uses it to mean what he or she wants it to mean. Generally, it covers all of the above types of software except Public Domain. If in doubt about the type of program you are using, check the licence agreement or the title screen of the program.

HERE'S THE PROBLEM - We have noticed a growing trend away from FREEWARE and toward other kinds of distribution schemes for software. Once upon a time, most people appreciated the opportunity to try out a package before having to pay for it. Today, the HONOUR SYSTEM seems to have less honour. Here are quotes from some of the developers we have had contact with:

> "...this is the last Shareware version of the program because I'm no longer certain the term 'Share' is appropriate. Why not just call it Public Domain or Freeware and be through with it because in the real sense that is what it is. To date there have been over 300 downloads from CompuServe alone. I conservatively estimate a 10:1 fan-out not counting sysops of local boards. This means that over 3000 copies ... have been distributed. We have received exactly two(2) registrations."
>
> "...We have been distributing ... for two years now and less than 1% of regular users have paid for copies. We feel that we have a right to be 'resentful'. We offer free of charge very inexpensive software for people to try out. We will not be in business very long if we do not have a way of convincing people that they should pay for something they are using."

User supported software is often among the best software available; even better than some of the

"Big Bucks" commercial software that you have to purchase. It never has the inconvenience and hassle of copy protection. It is available from many very convenient sources. It often has better support than commercial software. Try taking a commercial program back for a refund after you found it was full of bugs, or was simply not what you wanted!

User Supported software keeps the commercial companies on their toes, and everybody benefits from that. Commercial companies know they have to keep their products full of features, easy to use, and provide good documentation. If they don't, they simply have nothing to offer over a program that is available at a fraction of the cost. User Supported software helps keep ALL Software prices down and promotes competition.

HERE'S THE SOLUTION - The privilege to test a program for suitability to our applications, needs, and personal tastes is a very valuable thing. We will not have this privilege much longer if the authors of these programs are not rewarded for their work. These programs ARE NOT FREE! Every time we use programs and don't pay for them, we are sending the authors a message. That message is that we are not getting value from their work. Do you have any such programs around that you have not yet paid for? Keep the experiment alive! Look through your diskette storage box and into your wallet. Contribute! We have.

REVIEW - THE AMIGA BY COMMODORE

We recently had a chance to look at one of the newer, more powerful computers to enter the home computer market - the Amiga 1000 personal computer from Commodore. We had the computer for an eight day period in September, and it was without a doubt the most fun computer we have tested so far. It was in almost constant use. We had to drag people away from it, just to get this review done. Even BOB liked it, and he hates computers!

The Amiga is typical of the new generation of home computers, which provide incredible graphic and sound capabilities making new types of software possible. It also has the potential to make the usual software easier to use.

The Amiga is a complete departure from previous computers from Commodore. It is not compatible with the Commodore 64 and 128 computers, and while it can run "the most popular" IBM PC compatible programs, that is not where its real strength lies. Making effective use of the Amiga's capabilities requires that new programs be written for it. This makes software availability a problem on a machine as new as this. However, if the software we were able to use is any indication, there may be enough software available right now for many owners to make good use of their Amiga.

THE HARDWARE - The Amiga computer is built in a case which is 45 cm wide, 11 cm high, and 33 cm deep. The base computer comes with 256k ram, one 880k, double sided, 3.5 inch disk drive, a mouse, and a 90 key detachable keyboard. The back of the computer is equipped with connectors for the keyboard, a parallel printer, one or more external disk drives, an RS-232-C serial port, RCA jacks for connection to an external amplifier or stereo system for sound, and connectors for an analog RGB monitor, television set, or composite monitor.

While the serial and parallel connectors on the Amiga are nearly compatible with those on an IBM PC, the Amiga can supply power through some of the pins not normally used in IBM applications. Despite assurances by the dealer, the IBM printer cable we had would not work without modification. Worse, it was possible to short out the computer's power supply by accidentally plugging a standard RS-232-C cable into one of the serial connectors. This caused the computer to immediately lock up, but caused no apparent permanent damage.

It appears that Commodore's long-standing tradition of using non-standard connectors continues with the Amiga.

Overall the machine lacked the solid feel of other computers in this price range. The computer case was made entirely of plastic. The keyboard felt soft and inexpensive, and the mouse produced an annoying "squeak" whenever it was moved across the table. However, in eight days of hard use, the hardware worked without a glitch, except that a couple of disks had to be reformatted. This is not unusual for a machine fresh out of the box.

The machine we were supplied was equipped with the Amiga analog RGB monitor. You can use a television set or a composite monitor with the Amiga, but we don't recommend it. The results will be very disappointing, due to the poor resolution. The Amiga is capable of showing 32 different colors on the screen at the same time from a selection of 1024 different colors. Most of the software for this machine will be written to take full advantage of all these colors, so you will find yourself limited in the software you can run without a good analog color monitor.

The supplied 32 cm monitor produced bright, clear colors and easy to read characters, but developed a very slight green tinge in the upper right hand corner. It also had a built-in amplifier and speaker for use with the Amiga's sound output jacks, but much better results were achieved when the Amiga was connected to a stereo system. The last piece of hardware we had to try out was an external 5.25 inch disk drive. This drive only works with IBM PC compatible disks along with the Transformer (more about that later). This 5.25 inch drive is not really necessary unless you have copy-protected software. We did not have a second 3.5 inch drive, and while the machine was workable without one, it would have saved a lot of disk swapping if we had used two drives.

NEXT MONTH - We will cover the software we tried out and describe a way of running IBM software on the Amiga (the Transformer).

COMPUTERS FOR CHRISTMAS

There are less than 20 shopping days till Christmas, so it's time once again for our annual summary of the microcomputer market. Santa's elves read on, so you will know what to buy for the kids, the spouse, or for yourself.

This year has been marked by large cuts in prices on many machines, and the entry of a few new machines into the market too.

We will break the market into three price ranges: systems under $1400; systems between $1400 and $2400; and systems over $2400. Our definition of a basic system includes the computer, monitor, disk drive, and printer. Prices may vary considerably; it all depends on what you buy.

UNDER $1400

The home computer market has been very cut-throat and there has been some instability in this market as a result. Computers in this bracket make nice Christmas presents and won't break your pocketbook. While they're usually regarded as "game" computers, some have some decent software available. They can be a good starting place if you don't have a good idea of what you need.

COCO3 - replaces the COCO2. Sale prices are $200 for the 128k base unit. It can be connected to a TV, but to get the full effect of the colors, you will want Radio Shack's RGB analog color monitor, or a monocolor monitor. A serial printer can be added for $280+, and a disk drive for $400. Total system price: $1100 to $1380 (about the same as last year for the COCO2). Software for running a business is still severely limited, so consider this a home computer.

TANDY 102 and 200 - the correspondent's favorite laptop. They are compatible with nothing else in the world, but still have loyal users. The system costs between $800 and $1200; add a printer and the total is between $1100 and $1500. This machine does not really offer good value for farm users, due to limited agricultural software availability.

IBM PCjr - has officially been declared a "non-product" by IBM, but systems are available through some discount houses for under $500. Add to this a monitor and printer, and you are still under $1,000. Future expansion will be limited by the lack of options.

COMMODORE 64C - Commodore has upgraded the 64 to the 64C, but prices are still about the same as last year; a system costs between $1100 and $1500 depending on your choice of monitors. The 64 continues to be the favorite "home" computer, and continues to enjoy large sales.

BETWEEN $1400 AND $2400

This range finds the bulk of the machines with the true capability to handle business record keeping systems. They also are still affordable as machines for the kids. This year, this category is dominated by the IBM PC and compatibles.

IBM-PC AND COMPATIBLES - this area of the market has continued to show strong growth. A full 86% of the software in our Agricultural Software Directory runs on these machines. Prices have come under real pressure, and competition is hot! Systems including 640k and two disk drives start at $1800, which is down $500 from last year.

TANDY 1000 EX - new on the market this year and one of two replacements for the Tandy 1000. We are giving this IBM compatible separate mention due to its high market presence this Christmas. It is targeted at the educational market, and is not hardware compatible with normal IBM PC boards. The base unit comes with 256k of memory, and one disk drive for $1300. Add a monocolor monitor and a printer, and the total cost is $1800.

TANDY 1000 SX - also new on the market this year as a replacement for the IBM compatible Tandy 1000. A packaged deal includes 384k memory, two disk drives, and a monocolor monitor for $1600, making it a better deal than the 1000 EX. Add a printer and total price is $1900. For less than $100 more than the EX, you gain hardware compatibility with IBM option boards, and the ability to add a hard disk!

TRS 4D - the old standby of Radio Shack and the last holdout of the TRSDOS operating system. A system costs $2200. We are under the impression that Radio Shack will be fading these machines out of production soon, so it is unlikely that much new software will be developed. There are better machines available with more future in this price range.

APPLE II GS - brand new on the market, but delivery will not be in time for Christmas. Not a great deal is known about this machine yet, but it seems to promise compatibility with Apple II software, and enhanced graphics and sound.

ATARI 520ST AND 1040ST - last year we conjectured on the ability of Atari to survive as a company, but they are still with us, and so is the 520ST. New this year is the 1040ST, which is basically a 520ST with a little more power. There still isn't much agricultural software, and these machines seem to have found their niche in the "home" market. A 520ST system would be $1600 with a monochrome monitor, but you will want the color monitor, so budget $2000.

OVER $2400

Here we find the machines that are technologically more powerful. These machines may be difficult to justify on a pure cost basis, but the potential for hard work is almost limitless. Last year, the IBM PC and compatibles were included in this group, but this year they have moved down to the $1400 to $2400 range. Will next year find the IBM PC AT and its compatibles moving down a group, too?

IBM PC XT AND COMPATIBLES - There are a large number of machines in this category, and price competition is heated. The chief feature of XT's over PC's is the hard disk. Systems start at $3400.

IBM PC AT AND COMPATIBLES - There are starting to be a larger number of AT compatibles, and prices are under pressure as a result. The ATs feature a much faster processor speed, and a very fast hard disk. Some systems are available starting at $5500. Few farms can justify the investment that these machines require.

AMIGA - was new on the market last Christmas, and has shown some strength over the last year. We have just completed a review of the Amiga, so you can refer to last month's and this month's issues for more details. The SIDECAR is now being shipped from the US, so MS-DOS compatibility is a new potential benefit. Systems start at $2500, but you would want the color monitor, and a good printer, so plan on spending $3400.

APPLE IIE - is still Apple's venerable contribution to the market. Our Agricultural Software Directory shows that 32% of software available runs on this machine, but we suspect that this percentage will drop as more software is developed for other computers. Systems start at $2600.

MACINTOSH - the new models this year are considerably improved in speed and function over last year's. Rumors continue to abound about new "modularized" Macs, and this year they may actually turn out to be true. There is even some talk about a new "Blue Box" that will let the Mac run MS-DOS software. There has been a flood of software in the last year, but there still isn't a lot of agricultural software available. Systems start at $2900 for the 512k Mac and $4300 for the 1 meg Mac.

REVIEW - THE AMIGA BY COMMODORE (CONTINUED)

Last month we covered the basic hardware of the Amiga. This month, we will discuss the software that we had the opportunity to test on this computer.

OPERATING SYSTEM - The standard Operating System supplied with the Amiga is called "Intuition". It is a graphic, window-based user interface like the Macintosh. Most of the housekeeping operations needing to be done on the computer can be done without ever having to use the keyboard; just point the mouse at the item you want, and click. For those who feel more comfortable typing in commands, an alternate program called CLI (Command Line Interface) behaves more like the traditional computer. Generally, the Intuition system works well, and makes the computer easy to use. Unfortunately, there are times when you must resort to using the CLI to get some jobs done. For example, after downloading a file using the communications program ONLINE, we returned to Intuition, but could not find our file until we started the CLI. It took a few tries to figure out what had happened. Once we loaded our file into BASIC and saved it back, everything was OK and Intuition could then find the file. The novice computer user could find this as confusing as we did.

APPLICATIONS - We were also supplied with several application programs for the Amiga, including a music program, a graphics program, a CADD (Computer Aided Design and Drafting) program, a file handler, a spreadsheet program, a communications program, and MindWalker (the office's new favorite computer game). We don't know if these programs represent good or bad examples of what the Amiga is capable of, but here are short descriptions of what we tried:

MUSIC: The Music Studio shows off the Amiga's sound capabilities. When the program starts up, you are presented with a blank music staff, on which notes can be placed using the mouse. Up to fifteen different instruments can be defined at any one time, and the program can play four note harmonies. The Amiga has a built-in sound synthesizer, and can produce credible reproductions of pianos, guitars, trumpets, and other musical instruments, as well as instruments never heard anywhere else. The Music Studio would be an excellent program for anyone interested in writing or playing music, and would be an excellent way to learn about music and musical notation without having to learn to play an instrument.

GRAPHICS: Delux Paint from Software Arts is an easy to use master graphics package. Think of it as the ultimate etch-a-sketch. You are given a paintbox with 32 different colors in it, each of which can be changed at will. The program provides tools to draw dots, curves, lines, boxes, circles, polygons, text, and free-hand sketches. It can automatically blend and mix colors, and using a feature called Cycle, you can create beautiful kaleidoscope type patterns, including an animated waterfall. If you decide to buy an Amiga, Delux Paint is a must.

CADD: The other graphics package we were sent for review is called Aegis Draw. Where Delux Paint is intended mainly for fun (since few people will have the kind of color printer necessary to reproduce the drawings you can produce with it), Aegis Draw is intended for designing, drafting, etc. - anywhere precise technical drawings are required. The program appears easy to learn and to use, and provides a variety of tools to simplify the production of drawings, particularly repetitive ones. The one problem we had with it was that while the program will supposedly work with any Hewlett-Packard compatible plotter, we couldn't get it to reliably run our Hewlett-Packard plotter. To compound the problem, the documentation on how to use the plotter related only to a specific model of Roland plotters, and was of no help to us.

FILE HANDLERS: MiAmiga file is a simple flat-file database. It can display data in two ways: the more traditional form used by most databases; and a list, which can best be compared with a spreadsheet. The program makes good use of the Amiga's graphic interface and mouse, to make it easy to operate. MiAmiga file can sort its database on any field, and can easily handle multi-level sorts.

MiAmiga file would be an excellent program to use for relatively simple database chores such as mailing lists, herd records, and inventories.

SPREADSHEET: VIP Planner is a Lotus 123 compatible spreadsheet. We had a lot of trouble with it, until we discovered that the 64 column default mode had to be changed to 80 columns for the screen to work properly. Once that was taken care of, we were right at home with it, and all our regular 123 commands and templates worked as expected. It was able to run all of our ADA standard templates, with only one exception: ROP220 (our Record Of Performance for beef cattle). With this template, it translated a named range incorrectly, but a change to one cell corrected that. Actually, this is a problem we have also seen with other 123 clones. VIP Planner's graphic abilities are better than Lotus 123's (mostly due to the superior graphic abilities of the Amiga), and any graph produced could be transferred to the paint program for further "sprucing up".

BASIC: The Amiga was originally shipped with Metacomco's ABasic as a BASIC interpreter, but is now being shipped with Microsoft's Amiga BASIC. We were hopeful that our ADA BASIC programs would run with relatively minor alterations, and surprise! we were right. After making a few changes, the programs ran perfectly with a few minor exceptions. We were not, of course, making full use of the special features of the Amiga (such as a synthesized voice that could tell you that input must be between 3 and 25; or all of the colors available), but six of the programs are now available on our RBBS for downloading. Sorry, but since we no longer have the Amiga, we are not able to copy disks for mailing!

COMMUNICATIONS: Online is a very capable communications program that we only had one problem with. As we described earlier, files that we downloaded could not be found by other programs until we also created an ICON file for them. Otherwise, we had no problem setting up communications with remote bulletin boards. In fact, at one time we ran 60 feet of cable down the hall between the Amiga and our Compu-Farm RBBS, and were successfully able to transfer files at 19,200 BPS. At first, we thought we had a problem, because between the time we were able to yell down the hall to say a transfer had started, and the recipient looked back at the screen, the transfer was already done! We thought something had happened, but a look at the directory showed that the file was there. Now that's fast! Too bad that those speeds are only attainable through direct connections, and not by modem (yet).

GAMES: MindWalker is now legendary in our office. It is a marvelous blend of graphics, animation, and sound, that we believe shows the Amiga at its best! You, the hero figure, move through a 3-D world, trying to find a path through the twisted shards of a physicist's mind. The combination of 3-D graphics in 32 colors and great sound (as played through a small stereo system), almost had one unsuspecting person two feet off the floor as the "hero" was zapped by a heat seeking beam! As we said last month, even BOB liked it!

IBM COMPATIBILITY - All of this great new power is not of much benefit to the manager of a business without a wealth of business software to go with it. Quite simply, the business world is presently dominated by MS-DOS software for IBM's and compatibles (86% of the software in our Agricultural Software Directory runs on MS-DOS systems). A program called the TRANSFORMER promises the potential of the best of both worlds. It claims the ability to run "the most popular" software for IBM's in monochrome mode. We found its claims to be substantially true, and were able to run Lotus 123, Procomm (a telecommunications program), and many compiled BASIC programs with no problem. We were not able to see graphs in Lotus 123, and some of the BASIC programs were sloooowwww (one familiar accounting program took 22 minutes just to get to the main menu, but this is due more to the insufficient way it was written than because of the Transformer). We conclude that the Transformer is not fast enough. Something else is just now being shipped that may provide a more viable way of running MS-DOS on the Amiga. It is called the SIDECAR, and is a hardware and software combination. Commodore has promised it will sell for less than $1000US. It includes an 8088 CPU, BIOS ROMS, 256k of memory (expandable to 512k), a socket for an 8087 coprocessor, a 5.25 inch disk drive, a connection for an external disk drive, and its own power supply. If this option lives up to its promise, it will run most IBM software at the same speed as an IBM would.

So what? Spend as much on a SIDECAR as on an IBM compatible and still have to buy an Amiga? What is the point? Actually, there may be several:

1) The absolute fun of the Amiga which is gained by owning one.
2) The ability to run the wealth of software available for the MS-DOS standard which will be gained (we hope) by the SIDECAR.
3) The SIDECAR works as an expansion chassis for the Amiga. Any hard disk installed in the SIDECAR is available to the Amiga, too. A 2 meg board for the SIDECAR will also be usable by the Amiga in normal mode. Synergism results when two or more things share resources to increase overall effectiveness, and the Amiga with SIDECAR demonstrates this.

If you are considering the benefits of the Amiga, and still yearn for MS-DOS compatibility, then the Amiga with SIDECAR may be the way to go.

COSTS - The prices as supplied to us are:

Amiga	- $1995
1020 (5.25) Disk Drive	- $ 500
Analog RGB Monitor	- $ 800
Transformer	- $ 150
1050 Ram Expander	- $ 300
VIP Professional Spreadsheet	- $ 300
Aegis Draw	- $ 280
Delux Paint	- $ 145
Music Studio	- $ 85
MiAmiga File	- $ 140
MindWalker	- $ 80
Online	- $ 100

Please note that these are retail prices. You are the shopper, you can make your own best deals.

SUMMARY - As we have indicated, more excitement and enthusiasm was generated in our office by the Amiga than any other machine since our Texas Instrument TI-59 programmable calculator in 1977! Granted, most of the Amiga enthusiasm was a result of features that will not help you run your farm any better. However, through the SIDECAR, you may be able to run the wealth of MS-DOS software that will help you manage your farm, and still be able to ENJOY!

Will the Amiga be able to combine the Home and Business markets? Only time will tell.

We owe a special thanks to the Computer Shop, 3515 - 18 Street S.W., Calgary T2T 4T9 (403) 243-4356 for their continued support by lending us this equipment and software.

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OBSOLESCENCE VERSUS "INSTALLED BASE"

One of the factors that you often have to consider when purchasing a computer is obsolescence. How long will it be before a machine is obsolete, and it becomes difficult to sell or trade?

We recently had a phone call from a person who had been leasing a Vector Graphic for the last five years, and the lease was now up. He wanted a replacement, and was glad that he had not purchased the Vector Graphic, since he felt it was now a "dinosaur" and would be almost impossible to sell. He wanted to avoid this with the machine he was about to get. Should he buy, or lease again? Which machine should he get?

Things have changed a lot over the past five years. At one time, the Vector Graphic was one of the most powerful personal computers a person could own. It ran the most up-to-date operating system of the time (CP/M) and had an unbelievable 64k of memory! Who could ever need more than 64k?

Now the business world is dominated by MS-DOS and 640k of memory is becoming insufficient. Will the computers that are around now be dinosaurs in five years? What effect will the new "80386" and "68030" machines have? Will even an IBM AT be a dinosaur in five years?

The answer to these questions can probably be found in something that is known as "installed base". Installed base refers to the millions of PCs that occupy desktops right now (as opposed to only thousands for the Vector Graphic). These PCs still function perfectly well, and will continue to run the same software that they run now. It is unlikely that you will be seeing very many of them on the garbage heap. There are too many of them, and they will continue to do their jobs well.

It is also because there are so many of them that developers will continue to have a reason to produce new software and hardware for them. Not many people on the farm need the power of an AT, much less the multi-user, multi-tasking operating systems that the new "80386" machines are capable of.

The purchase of an IBM PC or PC AT or compatible now, will likely remain a good investment. After all, more than six million people can't be wrong!

Provides valuable information for those working with MultiPlan, SuperCalc, or Lotus 123.

EQUATION CORNER

Equation Corner is a column that was started in 1981, and ran up to 1982. At that time, the major language in use was BASIC and the main spreadsheet was VisiCalc. Both lacked sophisticated functions that would calculate things such as present values, payments on loans, etc. Since then, spreadsheets such as MultiPlan, SuperCalc, and Lotus 123 have incorporated many of these functions. Every once in a while, however, we still run across a problem for which there is not a built-in function. This month we have two equations, one of which will have wider interest than the other. (This also gives us the chance to try out the nifty new scientific word processor called Manuscript from Lotus).

BALANCE OF A LOAN (BALLOON PAYMENT) - e.g. What is the balance after 6 years, on a $1,000 loan, that is amortized over 10 years at 10 per cent interest, and has payments of $162.75 per year? The equation is:

$$BAL = \left(PV - PMT \times \frac{1-(1+i)^{-N}}{i} \right) \div (1+i)^{-N}$$

Where: BAL = balance of the loan
PV = present value (the original loan amount)
PMT = the payment
i = interest rate (in decimal format)
N = the number of payments to be calculated

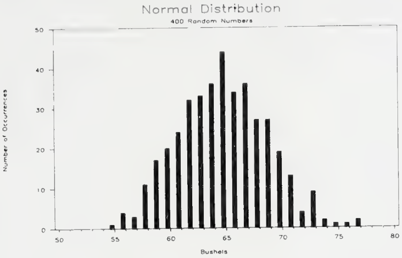
In Lotus 123 the cell entries would be:

```
A1: 'PV
B1: 1000
A2: 'PMT
B2: 162.75
A3: 'i
B3: 0.1
A4: 'N
B4: 6
```

```
A6: 'BALANCE
B6 :(B1-B2*(1-(1+B3)^-B4)/B3)/((1+B3)^-B4)
```

(and the answer is ...... $515.85)

GENERATION OF RANDOM NUMBERS ON A NORMAL DISTRIBUTION -If you were analyzing the effect that barley yields would have on projected cash flows over a number of years, you would want to generate a series of random yields that represented real life. The following graph shows how these yields might look:



This graph shows that more of the yields fall close to the average of 65 bushels than fall near 60 bushels. A curve like this is known as a normal "bell" curve. Numbers that follow this kind of curve can be generated with the following equation:

$$x = \sigma'\sqrt{-2\ln u_1}\cos(2\pi u_2) + \bar{X}'$$

Where: σ' = the STD (standard deviation) (we used 4)
u_1 = a random number between 0 and 1
u_2 = a random number between 0 and 1
$\ln$ = natural log
$\bar{X}'$ = the mean (we used 65)

Since this is a very complex equation, and also of limited application, we will not give programming examples here. A Lotus 123 template called "NORMAL.WKS" is available in the UPLOADS section of our RBBS which demonstrates this technique.

VOLUME VII, NO. 11, JANUARY, 1987

BOOKKEEPING WITH A SPREADSHEET

When we originally planned this third part of the BWAS series, we wanted to show you how to build a bookkeeping system that uses the multi-dimensional database capabilities of VP-Planner. We have now had a better chance to work with this program and have found some deficiencies that reduce its effectiveness for this purpose. Instead of presenting a "how to" guide like we have done in the previous parts of this series, we will present an explanation of "what it is". Many interesting concepts that can still be learned by looking at this program. For those who do want more detail, we have a file on our Compu-Farm RBBS called BWAS5.ARC that contains descriptions of our sample database, the sample database, and worksheets. Those who do not have modems can write to us and we will send photocopies of the information.

WHAT IS A MULTI-DIMENSIONAL DATABASE? All of the spreadsheet work that we have done to date has been in two dimensions. For any one month, we used one dimension (across) for our accounts and another dimension (down) for the entries, like this:

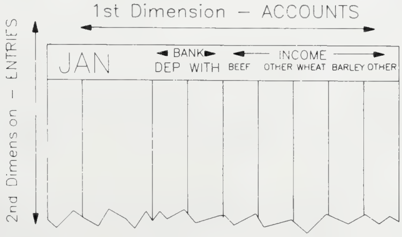


Figure 1

We needed separate spreadsheets for each month's expenses and each month's income. We finally brought the monthly totals into a summary for the year, giving us a total of 25 different spreadsheet templates to store and manipulate.

A multi-dimensional database allows us to keep the months as a separate (third) dimension, something like stacking pages of a ledger sheet behind each other like this:

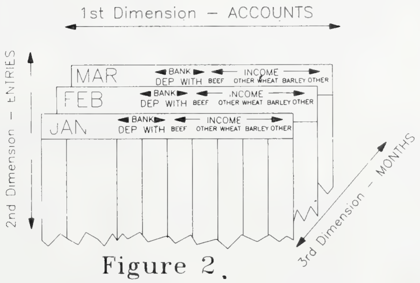


Figure 2.

HOW DOES VP-PLANNER LET US DO THIS? We first define each of the three dimensions in the multi-dimensional database. Dimension 1 could be the Entries, dimension 2 the Accounts, and dimension 3 the Months and Totals for the year.

We do not work directly with this database, however. We need to set up a worksheet (in two dimensions) to retrieve and store information. If we want the information in Figure 1, for example, we need a spreadsheet to retrieve that information from the database. To work with a different month, we simply change the label in the upper left corner from "Jan" to "Feb" and the February information will replace January's. This one spreadsheet can be used for all 12 months, and we have reduced the number of files required from 25 to 3!

The real advantage of this multi-dimensional approach is the way we can store and look at information. By "fixing" any one dimension, we can see how the other two dimensions look. If instead, we want to look at a single account's transactions for the year, we can set up a spreadsheet like the "FERT" front page here:

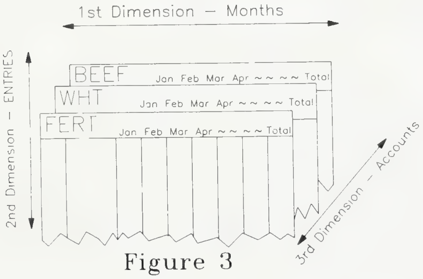

1st Dimension — Months
2nd Dimension — ENTRIES
3rd Dimension — Accounts
BEEF
Jan Feb Mar Apr ~~ ~~ Total
WHT
Jan Feb Mar Apr ~~ ~~ Total
FERT
Jan Feb Mar Apr ~~ ~~ Total

Figure 3

To see different accounts, all we have to do is change the account name in the upper left corner to the account we want to see, and the spreadsheet will retrieve the new information from the database.

VP-PLANNER allows us to define up to five dimensions; we could use the fourth dimension to define a second farm and the fifth to define different years.

WHAT ARE THE DEFICIENCIES? First - text cannot be stored in the database. This means that the description (an important piece of information) cannot be stored. Second - we have to predefine the maximum number of entries we might be making each month. If your farm is like many, you typically make more entries during April, May, and June than in other months. This means that the database has to be predefined so that all months have this large number of entries. If you later find that this is not enough entries, the database must be redefined.

P.S. - the latest version of VP-PLANNER is version 1.3. There were some bugs in earlier versions, so be sure that you have this new version. Updates are available for $US10 directly from Paperback Software.

LOOKING AROUND THE COMPU-FARM RBBS

Starting this month we are going to give short descriptions of some of the programs that have been uploaded to our RBBS. If you want any of these programs just sign on to our RBBS and download them. Sorry, these programs are available only through the RBBS, we cannot send them out on disk.

COWMANCD.WK1 - Beef Herd Management Worksheet for Lotus 123 - This template is a combination of four interdependent worksheets along with a "road map" to help the user understand the layout of the template. These worksheets may be accessed through ALT key macros. They include:

COWMOD - COST AND RETURNS WORKSHEET
COWDEBT - HERD DEBT CAPACITY WORKSHEET
HERDPRO - HERD PRODUCTIVITY WORKSHEET
PROFILE - CALVING SEASON PROFILE

Macros have been set up to assist the user to find their way around the worksheets and to simplify certain operations, such as printing reports. These pre-defined macros may be edited and customized according to the user's needs. Pressing the F5 key followed by the F3 key displays a list of available macros.

The worksheet is protected except for input regions. This means that the input regions are highlighted (monochrome monitors) or green (color monitors).

COWMOD - a module for estimating costs and returns on the herd. Some data used in this module is derived from data entered in other modules in the template. It is important to complete data entry of relevant information in these other modules before printing any final reports.

COWDEBT - a module for determining the debt carrying capacity of a herd. Debt carrying capacity is based on a capital recovery factor, multiplied by the balance of cash returns over direct costs and living allowance. Essentially, this module helps determine how much debt a cow herd can support.

HERDPRO - uses the Gracey formula, developed by Charlie Gracey, to estimate the economic productivity of a beef cow herd using 11 different variables which can affect income. These include calf crop, weaning weights, prices and a number of other factors.

PROFILE - is designed to show how income is affected by calving profile. It records the number of calves born each week in a beef herd. Females are grouped as first calf, second calf, or mature cow. An analysis of the total pounds of weaned calf produced, and the income from weaned calves is based on the assumptions of the weight of the first calf born, the preweaning gain per week, and the weighted average price for steer and heifer calves. The calving profile is displayed as a bar graph.

For more information about this Lotus 123 template, contact Ross Gould or John Basarab, Animal Management Section, Beef Cattle and Sheep Branch (phone 427-5335).

VOLUME VII, NO. 12, FEBRUARY, 1987

COMPUTERS ON WHEELS AN UPDATE

Our Computers On Wheels courses are now half-way through a three year project, so we thought it was time for an update on what we have done so far. In the first year of operation, a course called "Introduction to Computers for Farm Use" was offered to over 850 people. A follow-up survey of course participants indicated the need for more in-depth courses in areas such as problem solving with a spreadsheet, bookkeeping on a computer, and the use of computer databases on the farm.
As a result, this year we added "Problem Solving With A Spreadsheet", and in conjunction with Olds College, are also offering "Introduction to Computerized Farm Accounting". A course on databases for farm use is being planned for next year.

The Computers On Wheels project is continuing to develop new methods of teaching computer use to adult students in the agricultural community. When the project is completed, we will be able to share these new teaching methods with universities, colleges, and private businesses. If you are interested in one or more of these courses, contact your district Alberta Agriculture office.

LOOKING AROUND THE COMPU-FARM RBBS

The Weekly is now available on the Compu-Farm RBBS! The Weekly is published once a week by the Market Analysis branch of Alberta Agriculture, and offers timely market news and short term analysis on agricultural commodities, including wheat, feed grain, oilseeds and livestock. In addition, it summarizes and analyses developments in world agricultural markets from an Alberta perspective. This newsletter is printed and mailed to over 8000 producers every Friday, which means that it doesn't arrive in the recipient's mailbox until early the following week. Test earlier this month have led to The Weekly now being available as a downloadable file on the Compu-Farm RBBS.

An abridged version of The Weekly has been available on Grassroots for some time, but the version available on the Compu-Farm RBBS has the benefit of being a complete, unedited version.

The Weekly may be downloaded from the Compu-Farm RBBS every Friday afternoon after 5:00 pm. It is available as both an ASCII text file format or as a compressed ARC file. An ASCII file can be directly accessed by most personal computer word processors or sent directly to a printer. The ARC file has the advantage of size; as a smaller, compressed file, it requires less time to download than the ASCII version - important for long-distance. Of course, the ARC.EXE program (also available on the RBBS) must be used to unARC the file back into an ASCII format before it can be read.

The files are called WEEKLY.THE (ASCII version) and WEEKLY.ARC (ARCed version) and are located in directory 2 of the file section of the RBBS. This is yet another example of rapid information access provided by computer and telecommunications technology.

FINANCIAL ACCOUNTING VERSUS FINANCIAL MANAGEMENT

Potential users of farm accounting software should be aware of the difference between financial accounting and financial management. Financial accounting systems are essentially general ledger systems implemented on a computer. Financial management systems include financial accounting as well as other management aspects. Some of the possible considerations are:

- automatic inventory adjustments
- enterprise analysis
- market value analysis
- budgeting analysis
- prior period comparisons
- export of files for use by another program (in particular, a spreadsheet program for further analysis).

No one system will encompass all financial management aspects optimally. There is usually a trade-off between one aspect and another. Users must decide which aspects will be most useful to them. There are also several considerations that should be given to the 'farm' aspect of farm financial management systems.

Because most farmers value their product inventory at current market or net realizable value (market value less marketing charges such as freight and handling), their inventory value/unit can decrease or increase due to market fluctuations. Potential users of farm accounting software should be aware of the problems that can then arise when systems maintain both a beginning and ending inventory total value. Most systems that maintain the beginning and ending inventory values will not allow the user to change the value per unit of the beginning inventory. These systems then calculate net income by using the formula:

value of production = ending inventory - beginning inventory + sales

This can misrepresent the actual production picture. For example: at the beginning of a year a farm has inventory of 100,000 bushels of wheat. During the year, all of this wheat is sold, and another 100,000 bushels of wheat are harvested. The value of production is this 100,000 bushels of wheat. However, if the beginning inventory is valued at $5.00/bushel, and sold for $4.00/bushel, and ending inventory is valued at $3.50/bushel, the previous equation will not arrive at the proper answer (100,000 * $3.50 = $350,000). It will instead arrive at this answer: $350,000 - $500,000 + $400,000 = $250,000.

In order to compare income statements from different years, it is essential that the value of product inventory produced during any given year be included on an accrual income statement. For example, because of lack of quota during one year, a farmer sold no grain, even though production had been good. The cash income statement for that year would drastically understate the net income, because the value of inventory produced would not be included. An accrual income statement would record the value of production, and would result in a more meaningful income statement.

Many farmers say that they do not understand or want to understand double entry accrual accounting. However, in order to obtain the maximum benefit from any financial management system, double entry accrual accounting is a requirement. Some "user-friendly" systems attempt to make the double entry aspect almost invisible to the user by the use of default offset accounts for many transactions, creating relationships among income-expense and inventory accounts in order to perform automatic inventory adjustments, etc. However, this often creates more problems than it solves: some systems do not handle the resulting entries correctly, and others make it difficult for users to make the entries that they want.

Many farmers will want to use accrual accounting for financial management decisions but will still want to obtain a cash income-expense statement for tax calculations. Very few systems make any provisions for this. Users should also be aware that if the system provides tax planning calculations instead of a simple cash income-expense statement, the package will have to be updated yearly. Depending on the reliability and stability of the manufacturer, this could be a problem: the expected update may not materialize for a few months into the new tax year, or in the case of a dealer disappearing, the old package will be almost useless in a new tax year.

VOLUME VIII, NO. 1, MARCH, 1987

Some of the tax implications of buying or updating a system.

TAX AND THE FARM BUSINESS COMPUTER

Last March, we printed an article on Tax and the Farm Business Computer which proved to be very popular. The details of many items have changed over the last year, so here is an update:

Some hardware vendors are using potential tax breaks as an enticement to sell computers. There is only an element of truth in what is being said. Here's what's true:

Calculation of the Business Portion of an Asset - Revenue Canada stipulates that only the business portion of an asset is eligible for Investment Tax Credit (ITC) and Capital Cost Allowance (CCA).

One method of calculating the business portion of an asset for ITC and CCA is to estimate the number of hours you expect to use the computer for business and the number of hours you will use the computer for personal purposes. Be realistic! Next, total the hours. Then, create a fraction by using the number of hours for business purposes as the numerator and the total hours as the denominator and multiply the total cost of the asset being considered. The result is the business portion which is the basis for calculating ITC and CCA.

It is not uncommon for a computer located in an office outside of a residence to have a 100 per cent business portion. If the computer is located in an office inside a personal residence, the accessibility of the computer for non-business use is greater (i.e. education, recreation, etc.).

Investment Tax Credit (ITC) - The business portion of computer hardware, software and furniture is eligible for an Investment Tax Credit. This federal tax credit is a deduction from tax of either seven or ten per cent of the asset cost depending upon where you reside. People living in the southern portions of most of the provinces are eligible for the lower ITC rate of seven per cent.

This means that there is an automatic writeoff of either seven or ten per cent to the extent that one has federal tax payable. There is a refundable investment tax credit of 40 per cent of the unused portion of investment tax credits (on amounts earned from expenditures in that ear) leftover after the credit has been carried back three years. The remainder of the unused ITC after carry back can ONLY be carried forward seven years and can ONLY be applied against federal tax payable in those years.

In 1987, the ITC rates change from the ten and seven per cent to seven and five per cent for purchases in 1987 and then to three per cent for purchases in 1988. In 1989, the ITC rates will totally disappear.

Capital Cost Allowance (CCA) - CCA can only be deducted on the business portion of an asset after the ITC is subtracted if it is going to be claimed in that year. CCA, claimed for the first year of purchase, is one-half the annual rate. In the taxation year after purchase, CCA can be deducted at the full CCA rate on any remaining undepreciated capital cost.

Computer hardware and systems software (i.e. DOS, compilers) purchased at any time during 1986 can have CCA deducted at one-half the annual rate. Therefore, in the first year of purchase the deduction would be 15 per cent. If these items were purchased before 1986, CCA can be deducted in 1986 at the full annual rate of 30 per cent. These assets fall within CCA Class 10.

CCA can be deducted at 50 per cent for computer software (Class 12) - other than system software - purchased at any time in 1986. If the software was purchased before 1986, CCA can be deducted in 1986 at the full annual rate of 100 per cent. Class 12 includes application software such as accounting packages, spreadsheet programs, etc.

Computer furniture (Class 8) in the first year of purchase has a maximum deduction of ten per cent. Furniture purchased before 1986 can be deducted at the full CCA rate of 20 per cent.

Supplies - Supplies are totally deductible in the year of purchase. Supplies include: diskettes, print ribbons, print wheels, paper, etc.

Product Enhancements and Repairs - Product enhancements need to have the difference between the purchase price of the new upgrade and the trade-in value of the old asset added to the appropriate CCA class and depreciated appropriately. Minor enhancements, not totaling more than $250 in a year are usually accepted by Revenue Canada as an expense. Product enhancements include such things as trading a color graphics card for an enhanced color graphics card or trading a low resolution monitor for a high resolution monitor.

All annual repairs can be expensed in that year. Major repairs that extend the life of the system should be added to the appropriate CCA class.

The total cost of the software upgrade can also be included. For example, an upgrade for Lotus 123 can be written off totally in the year of purchase.

System Upgrades - System upgrade costs, such as the purchase price of a hard drive or a printer, should be added to the appropriate CCA schedule and treated accordingly.

Imported Products - Products imported into Canada usually require a duty and a Federal Sales Tax (FST) to be paid. To start the calculation, the dutiable value must first be obtained by converting the price paid or payable (as of shipment date) from U.S. dollars to Canadian dollars. This dutiable value is multiplied by the per cent duty applicable for that product (and/or its use) to obtain the duty payable. The total of the dutiable value PLUS duty payable is then multiplied by the per cent Federal Sales Tax to come up with Federal Sales Tax payable.

Here are some items that MUST BE computer peripherals or stand-alone products to be exempt from duty: disk drives (both hard and floppy), printers (without keyboards) and process control apparatus converting analog to digital signals or vice versa. For a disk drive to be duty exempt, it must be separate from the CPU unit or stand alone. If the drive forms part of the CPU unit, then it is considered part and parcel of the CPU unit and is dutiable at 3.9 per cent. There seems to be a good chance that most disk drives that are shipped separate from the CPU unit will qualify for exemption.

These items, though, are still subject to a 12 per cent Federal Sales Tax. Memory cards to be used as ram drives are considered to be "semi-disk drives" and are subject to a duty of 3.9 per cent plus 12 per cent Federal Sales Tax.

Most other computer accessories and peripherals are subject to a 3.9 per cent duty plus 12 per cent Federal Sales Tax. This includes: CPU units, expansion chassis, memory cards, memory chips, monitors, modems, cables, etc.

Imported software falls into a special category because it is duty free except for a Federal Sales Tax of 12 per cent applied to the dutiable portion. The dutiable portion consists of the cost of the media plus transcription ONLY. The amount of tax that has to be paid therefore depends upon how the vendor in the U.S. labels the package. To minimize duty costs and explanations to Canada Customs officials, Canada Customs accepts the following method of itemizing software costs. The vendor in the U.S. should be requested to break out the cost and wording of the materials into two separate categories: 1) type of physical media (i.e. diskette), size of media (5 1/4 inch), cost of production including the cost of disk packaging, cost of blank physical media and the cost of transcription of program(s) onto that physical media, and 2) cost of the program, technical manual, and licence fee.

EXAMPLE: Software costing $500 is properly detailed by the vendor as $2 for the cost of each 5 1/4 inch diskette (i.e. physical medium) PLUS cost of production and $498 as the cost of the program, technical manual and licence fee. The $2 (U.S.) is converted to Canadian currency, using the conversion rate as of the shipping date noted on the invoice, giving a dutiable value of $2.74. Duty is calculated using this amount as the base and then this duty (in this case $0) is added to the dutiable value to come up with a total which is multiplied by the 12 per cent Federal Sales tax. Federal Sales Tax payable would be $0.33.

NOTE: If the vendor does not properly mark the sales slip, Customs Canada officials can appraise EACH disk of a software package at $7.50 giving a Federal Sales Tax payable of $0.90 per disk.

Rebate of Sales Tax - Almost all computers, as we know them, are NOT eligible for this sales tax rebate. Computers or CPUs that are eligible are ones that are used 100 per cent or integrated 100 per cent into an agricultural process. For a computer to be considered used in an agricultural process, it must be controlling machinery that is used in an agricultural process.

Another method of explaining what is eligible would be to describe what is not eligible. If the computer is used for any accounting or record keeping purpose, then it is considered being used in an ADMINISTRATIVE function and NOT in an agricultural process. In addition, if the unit is used for any personal purpose (i.e. games), then this also would disqualify it from any rebate. Remember the CPU MUST be used 100 per cent of the time in an agricultural process.

An example of a CPU that would qualify would be one that is used in a milking parlour to control feed to cattle as they are being milked. Care must be taken in finding out if sales tax was already deducted for the complete unit from the purchase price at the time of purchase.

Any questions that may arise about the eligibility of your machine for a sales tax rebate should be clarified with an excise officer at your nearest Department of National Revenue. The rebate may be as high as 12 per cent depending upon the date of purchase. Importation details on computers or computer accessories and/or peripherals should be clarified with a Canada Customs officer. The appropriate telephone numbers can be found under Government of Canada in the white pages of your telephone book.

If there are any concerns or specific applications relating to tax, consult a professional accountant.

VOLUME VIII, NO. 2, APRIL, 1987

Provides a good comparison of the IBM line and also gives the novice an explanation of what the various features are. Clears up some misconceptions of the new PS/2 line.

NEW COMPUTERS AND TECHNOLOGIES

In the last few months, several computer companies have made announcements which have the potential to impact heavily on those of us on agricultural computing. Since the agricultural software market is dominated so far by programs that function under the MS-DOS operating system, we have to take notice whenever new machines that can use this large library of software are introduced.

Commodore has announced the Amiga 2000; Apple has announced both the Macintosh SE and MacIntosh II; and IBM has introduced the Personal System/2 series of computers. This month we are going to describe the new IBM computers, next month we will deal with the Commodore and Apple computers, and then conjecture what all this means.

There are four models in the new line of Personal System/2 microcomputers from IBM. The following table outlines a few of the major differences and similarities between the old and new IBM machines:

FEATURE	PC	PC XT	PC AT	PS/2 30	PS/2 50	PS/2 60	PS/2 80
CPU	8088	8088	80286	8086	80208	80286	80386
SPEED (MHz)	4.77	4.77	8	8	10	10	16/20
BUS	normal	normal	normal	normal	MCA	MCA	MCA
SLOTS	5	8	6	3	3	7	7
DISPLAY ADAPTOR	CGA not included	CGA not included	CGA not included	MCGA on main board	VGA on main board	VGA on main board	VGA on main board
PARALLEL	not included	not included	not included	included	included	included	included
SERIAL	not included	not included	not included	included	included	included	included
CLOCK	not included	not included	not included	included	included	included	included
DISKETTES	360K	360K	360K/ 1.2m	720K	1.4m	1.4m	1.4m
MAX MEMORY	640k	640K	15.5m	640k	7m	15m	16m

The meaning and significance of each of these features is:

CPU - stands for Central Processing Unit. This is the brain of the computer, and the higher speed that it can operate, and the more bits that it can move around at one time, the faster the entire computer can get work done. The 8088 handles data 8 bits at a time, the 80286 handles 16 bits at a time, and the 80386 handles data 32 bits at a time. Therefore, as we go across the chart the computers generally get faster.

BUS - The bus is a series of circuits that the CPU uses to talk to the world around it. If the bus has slots, then all the better, since it makes the machine adaptable. The original PC used an 8-bit bus with slots that many third party developers manufactured option cards for. It is largely because of this open architecture that the PC became such a successful computer. When the AT was introduced it expanded the original bus by widening it to 16 bits, but in a way that 8-bit option cards would still fit. The model 30 continues with this bus architecture. The models 50, 60, and 80, have a new bus architecture called "Micro Channel" that is more like IBM's mainframe computers than the old bus. This new bus removes many of the limitations of the old bus, and can move data around much faster. It will still be an "open" architecture, which means that third party developers will be able to manufacture option cards. Existing option cards will not fit in the new bus!

DISPLAY ADAPTOR - The display adaptor is the part of the computer that makes your monitor work. The original PC had a CGA (Color Graphics Adaptor) that could handle four colors in 320 by 200 pixel mode, or two colors in 640 by 200 mode. The new model 30 has an MCGA (Multi Color Graphics Array) built into the main board that can handle 256 colors in the 640 by 320 mode, or two colors in a 640 by 480 mode. The models 50, 60, and 80 do even better with a VGA (Video Graphics Adaptor) that can go right up to 16 colors in 640 by 480 mode. All of these models, however, require new analog monitors; your old digital monitors will not work.

PARALLEL AND SERIAL PORTS - are used for your printer, and modem. The original PC did not include these, so you had to purchase option boards to add these ports. All the new models have these included on the main board.

CLOCK/CALENDAR - lets your computer know what day and time it is even when it has been turned off. The new models have these included on the main board, freeing up slots for other uses.

DISKETTE DRIVES - The original PC had 5.25 inch, 160k drives, that were soon upgraded to 5.25 inch, 360k. With the introduction of the PC-AT, a 5.25 inch 1.2m drive became available, but it has never really been used anywhere except on the AT. The new models all have 3.5 inch diskettes of either 720k or 1.44m capacity. The new smaller physical size is a real benefit, but there will be problems for a while getting software in the new size, and with transferring your data between sizes.

MAXIMUM MEMORY - Some people say that memory is like cubic inches: the more the better. The original PC was happy with 64k or 128k, but now there are many programs that are not happy with less than 512k or even 640k. It is not hard to develop a Lotus 123 (TM) spreadsheet that requires 640k! The new models 50, 60, and 80, have the ability to use more than 640k, but an operating system that will let them do that is at least nine months away.

NEXT MONTH - We will describe the new Commodore and Apple machines, and discuss what the potential implications are to the agricultural computing world.

LOOKING AROUND THE RBBS

Several Lotus 123 (TM) templates are available on the Farm Business Management Branch Remote Bulletin Board system (403)556-4104, to calculate the costs of producing a crop, tax liability, or machinery operating costs, etc. Here are some sample templates:

T1GEN86.WKS is a recent addition to the remote bulletin board. This template allows you to calculate your 1986 tax return. Created by Ross Gould, this 60k template file is a near copy of the 1986 T1 general income tax form from Revenue Canada. It includes macros to save and print the completed form, and to relocate the cursor to various parts of the form. The user is responsible for correctness of all data entry and results.

CRDCROP.WKS is a template designed to calculate the costs of producing a crop. Additional information is provided on machinery operating costs. The template requires detailed information on machinery investment, machinery use, resource use in field operations and related financial information. Output includes specific field operation, hourly ownership and machinery operating costs on a per acre basis. In addition, this template may be used to generate a breakeven cost for producing the crop, as well as serve as a preliminary field record system to track operations performed on a field.

BUYLEASE.WKS calculates the present value of buying a new machine versus the present value of leasing that same new machine. The template generates a yearly cash flow for the interest, C.C.A., I.T.C., tax benefit and net cash costs and present value of the outflow. Information required for the program includes machine purchase and trade-in values, downpayments, term of loan and lease, interest rate, lease payments, length of ownership and CCA rate and for that machine. This template would be of use to anyone considering the after-tax costs of leasing or buying farm machinery.

MORTGAGE.WKS calculates the interest and principal portions of monthly payments and the outstanding balance of an amortized loan on a per-payment basis. Balloon payments are also permitted (balloon payments are applied directly to the outstanding balance of a loan). In addition, this template also allows for more compounding periods than payments per year. For example, loan payments may be calculated for an amortization period of ten years, compounded monthly and paid annually.

VOLUME VIII, NO. 3, MAY, 1987

AGRICULTURAL MANAGEMENT SYSTEMS - DIRECTIONS AND VISIONS

Industry and government alike are committed to developing new computer programs and services to better serve the agricultural community, says the chairman of a recent conference in Calgary.
Wilson Loree says computer and management experts, along with industry software developers and marketers, and agricultural extension specialists have agreed that the computer industry must be in step with the ever-changing needs of agriculture.

More than 100 participants, speakers and industry representatives were brought together in the first-ever Canadian conference on agricultural computing.

Loree, head of Alberta Agriculture's Farm Business Management Branch in Olds says speakers discussed topics ranging from Visions for agriculture in the 1990's to planning for people as users of systems. He says there were "rousing" panel discussions on such topics as the software review process and the roles of industry and government in the agricultural computer field.

Organized by the Farm Business Management Branch in co-operation with Olds College and the University of Alberta, the conference was considered a success by participants from across Canada, says the chairman.

"It provided an opportunity for participants to address questions on the state of agriculture in Canada and to discuss the special challenges and needs of a changing agriculture scene," says Loree. "Software developers took advantage of the opportunity to make business contacts and discuss possible new directions for software development in agriculture, and how to address their products for an ever-changing market."

Speakers included Doug Radke, assistant deputy minister, Alberta Agriculture; Ken Stickland, agriculture consultant; Dr. Steve Harsh, professor of agricultural economics at Michigan State University, and Lyle Warrington, past president of the Association of Agricultural Computing Companies (AACC) in the U.S. More than a dozen other speakers from industry, government and academic institutions were on hand to present their viewpoints.

Radke, along with other speakers, participated in a discussion on the roles and opportunitiesfor the public and private sectors in the agricultural software industry.

Other highlights of the conference included topics presented by Dr. Harsh and Dr. Kraft. They discussed requirements and opportunities for future agricultural software developments. In addition, Wayne Jones of Agriculture Canada, Mona Cox of Alberta Agriculture; and Dr. Gordon Wells of Biotechnica Canada discussed changes in agriculture from economic, social and technical viewpoints.

Closing speakers John Duvenaud, manager of Grassroots Information Services Ltd.; and University of Alberta professor, Dr. Bert Einsiedel, gave their views on why some farmers use computers while others do not.

In particular, Einsiedel pointed out why it takes "more than the availability and affordability of computer hardware and software for people to want to adopt and use a system."

"Conference coordinators are pleased with the results and are looking forward to working closing with private industry in planning a 1988 conference," says Loree. "Any organization or individual interested in participating is invited to contact the Farm Business Management Branch at 556-4240.

NEW COMPUTER AND NEW TECHNOLOGIES (CONTINUED)

Last month we provided a technical description of the machines in the new IBM PS/2 line of computers. This month we will describe two more machines that can run the MS-DOS operating system, and then discuss what impact all these new machines may have on agricultural computing.

APPLE MACINTOSH SE AND MACINTOSH II - announced by Apple in early March. Both machines take a significant departure from the old Macintosh in that they have slots. Slots mean one major thing - adaptability! One important thing you may be able to do with the new Macs is to insert a board from AST Research that will allow these machines to run MS-DOS. Early reports indicate that DOS will run at about the same speed as it does on an IBM XT. What you would have then, are machines that will run all the MAC software and can also run MS-DOS.

COMMODORE AMIGA 2000 - This newest version of the AMIGA has slots now, and that means you can adapt it with a "bridge" card that will let it run MS-DOS. The major problem here is that machines are not available yet, and US prices are very tentative.

AND THE IMPACT? The choice of what machine to buy is even more confusing. Should you buy a PC (or compatible) and take the risk of having an obsolete machine if the new PS/2's take off? Do you pay the extra for a new PS/2 and go for the future? Do you buy either an Apple or Commodore and get the best of two computers? Only time will tell. We certainly don't have the answers, but we do have feelings and opinions about how the market will shake out. Here they are:

IBM PS/2 MODEL 80 - a good choice if you are in a large corporate, multi-user environment. It is simply too powerful and expensive (over $10,000) for the average single user.

IBM PS/2 MODEL 60 - is priced at $8245, plus monitor ($389 for monochrome, and $1059 for 12 inch color). It can be considered to be a new, faster AT, with more slots (flexibility) than the model 50. It is unlikely that the average user will be willing to pay $2500 above the price of a model 50, just to get more slots, and bigger, faster hard disk.IBM PS/2 MODEL 50 - is priced at $5495, plus monitor. We had the chance to use one for three days, and were impressed at the speed. Its main attractions over a regular AT compatible are the faster speed (overall) and the much improved graphics. Whether this is enough to justify its higher cost and incompatible bus will be very much up to the buyer. For now, our own choice would be to buy an AT compatible, since many agricultural applications do not need the graphics and speed.

IBM PS/2 MODEL 30 - is priced at $2595, plus monitor. We used a Model 30 for three days, and were impressed by the graphics. Compared to a PC "turbo" compatible it is more expensive. Once again, it is not likely that many agricultural applications can justify the cost of the better graphics.

APPLE MACINTOSH II AND SE - with monitor, AST board, and disk drive will cost over $10000 for the II and over $5000 for the SE. Most agricultural users are unlikely to consider this a good choice, even if they get "the best of both worlds".

COMMODORE AMIGA 2000 - a system that will run MS-DOS will cost $5000. Guess our thoughts on this one.

AT COMPATIBLES - can be purchased with monitor and 30M hard disk for well under $4000. Since they have an 80286 CPU chip, they still hold the promise of running the new operating system (OS/2) when it is released.

PC COMPATIBLES - can be purchased with monitor for well under $2000. They will not be able to run the new OS/2 when it is released, but that is not likely to be of much consequence for most agricultural users.

THE FINAL STORY - remains to be told. If we had to purchase a computer right now, we would purchase either a PC or AT compatible, depending on how much we were willing to spend, and what kind of power we needed.

MISCELLANEOUS MUSINGS AND ANNOUNCEMENTS

COMPUTERS ON WHEELS - The second year of Alberta Agriculture's Computer On Wheels project drew to a successful close this spring with an increase of 10 per cent more participants during the 1986-87 winter extension season. The objective of the three-year Computers On Wheels project is to develop new and innovative methods to deliver computer training to farmers and provide them with hands-on experience and information on how computers can be used on their farms. Two vans, each with an instructor and a complement of computer equipment travel the province from November to late April. Courses were held in provincial buildings and community halls in rural communities throughout The province.

Planning for the project began in 1984, with the first courses offered in November of 1985.

Between then and April of 1987, there were over 1300 participants in 135 courses in 76 Alberta communities. The courses were rated satisfactory to excellent by 93 per cent of participants and 98 per cent said they would recommend the course to others.

Two types of courses are available; Introduction to Computers for Farm Use and Spreadsheet Applications to Farm Management. The introductory course covers basic computer operations, an introduction to spreadsheets, computerized record keeping, computer communications, word processing, recreational computing, and purchasing a computer system. The second course is designed for those who have a computer and a spreadsheet program.

It teaches how to apply spreadsheets to common farm management problems with an emphasis on planning and designing effective solutions.
These courses are offered over two, six-hour days for a cost of $45.

In addition, this last winter, in co-operation with Alberta Agriculture, a computerized accounting course was offered through the Olds College in Regions II and III of the province.
Course evaluations completed by participants reveal that nearly one-third of course participants already own a computer, and over one-half of the participants plan to purchase a computer. The courses will be revised this summer, in response to suggestions and comments made by course participants, and to better reflect the changing needs of agriculture.

Information on courses offered in a particular area can be obtained from Alberta Agriculture district offices.

The courses are made possible by the co-operative efforts of IBM Canada Ltd., the University of Alberta and Alberta Agriculture. IBM Canada Ltd. supplied the equipment, through their Co-operative Projects program. Alberta Agriculture, with some advice from the University of Alberta, has developed the curriculum and expertise in teaching farm managers about computer applications. Alberta Agriculture also provides the manpower, vans, and operating costs.
IBM's equipment contributions include: 22 IBM Portable PCs with 22 Prowriter printers, the Disk Operating System, and some educational software.

Provides a good example of linear Programming and how it can be incorporated into use on the farm.

LINEAR PROGRAMMING - PLOWING THE STRAIGHT FURROW?

No, Linear Programming (LP) won't help you plow a straighter furrow. Linear programming is a computational technique that allows you to find the best solution to a problem. Up to now, it has been difficult to use without special training, and has required a lot of computer "horsepower". Recently, however, some programs have been introduced that work with Lotus 123 and greatly simplify the user interface to LP. An example will demonstrate the kind of problem that LP can help solve:

Suppose we have a 1,000 acre farm and a choice of five crops: fababean, barley on last year's fababean, barley, canola, and wheat.

Several things can restrict (constrain) the amount of each crop we may plant:

1) The amount of operating money available. Assume we can borrow $100,000. Each crop requires different amounts of cash operating funds.

2) The total number of acres we have. We cannot plant more than a total of 1,000 acres.

3) The number of hours we have available in the spring and in the fall. Each crop has unique time requirements in the spring and the fall.

If we were trying to maximize the profit of this farm, we might be tempted to put all 1,000 acres into fababean. This would not be realistic, however, since the risk is too great, and our banker would not likely lend us enough operating money to plant 1,000 acres. A safer bet might be to put in 100 acres of fababean, 100 acres of barley on last year's fababean (as part of our crop rotation) and split the rest over barley, canola and wheat.

We can build a spreadsheet in Lotus 123 that will do these calculations for us, and let us "play" with the numbers until we find the best crop mix. A similar spreadsheet is also available for downloading on our RBBS and is named WBCROP.WKS. This file does not include the program What's Best!.

```
   ************
   TOTAL PROFIT          CROP MIX
        $0.00
   ************

                 FABA      BAR/
Crop             BEAN      FABA      BARLEY    CANOLA    WHEAT
Cost/acre        $124.15   $93.00    $93.13    $97.15    $102.55
Yield            3000      65        65        27        45
Price            $0.09     $1.80     $1.80     $5.00     $3.00
Profit/acre      $145.85   $24.00    $23.87    $37.85    $32.45
Max acres        100       1000      1000      1000      1000      ACRES     ACRES     NOT
Unused acres     0         900       1000      426       780       USED      AVAIL     USED
-------------------------------------------------------     ---------------------------------------
Acres            0         0         0         0         0         0         1000      1000
-------------------------------------------------------     ---------------------------------------


                                                                            Crop Resources Used
------------------------------------------------------------    --------------------------------
             Crop Resource Requirements Per Acre                             Total    Start   Ending
             FABA      BAR/      BARLEY    CANOLA    WHEAT                   Usage    Inven.  Inven.
------------------------------------------------------------    --------------------------------
Operating    $124.15   $93.00    $93.13    $97.15    $102.55  Operating      0        100000  100000
Spring hours 0.42      0.33      0.42      0.44      0.33     Spring time    0        400     4 0 0
Fall hours   1.31      1.07      0.99      0.96      1.07     Fall time      0        1100    1100
------------------------------------------------------------    --------------------------------
```

Notice that fababean is the greatest consumer of our resources, and barley on last year's fababean is the least consumer.

Our crop rotation dictates that we plant 100 acres of fababean, and 100 acres of barley on last year's fababean field. Since canola is more profitable than barley or wheat, we may be tempted to seed as many acres of it as we can. Plugging different numbers into our spreadsheet reveals that we can plant only 738 acres of canola before we run out of time in the spring, and that this gives us a profit of $44,918.30. Is this the best crop mix for our operation?

NO!

What's Best! from General Optimization Inc., is a commercial program which uses LP techniques to find the best solution to this type of spreadsheet problem. It greatly simplifies the user interface to LP. In fact, if you can build a spreadsheet like the one above (with the proper constraints, etc.), then you can easily use What's Best!. The manual describes the "ABC's" of setting up What's Best!:

A - Set the Adjustable cells. In our example, these are the cells that determine how many acres of each crop will be planted.

B - Set what the "Best" cell is and what should be done with it. In this example, we would tell What's Best! that the Total Profit cell should be maximized.

C - Tell What's Best! what the Constraints are.

This is the most complicated part of setting up the model, but there are several different methods that can be used. In our example, no cell will be allowed to be less than 0, therefore we cannot plant more than 1,000 acres, use more operating funds or more hours. We also cannot plant more than 100 acres of fababean.

We then tell What's Best! to optimize the spreadsheet, and it will automatically do just that. In our example, the results returned can be somewhat surprising, too! It turns out that the "best" solution to the model is this:

```
**************
TOTAL PROFIT         CROP MIX
  $45,835.48
**************

                 FABA     BAR/
Crop             BEAN     FABA       BARLEY       CANOLA     WHEAT
Cost/acre     $124.15     $93.00     $93.13       $97.15    $102.55
Yeild         3000        65         65           27        45
Price          $0.09      $1.80      $1.80        $5.00     $3.00
Profit/A       $145.85    $24.00     $23.87       $37.85    $32.45
Max acres     100         1000       1000         1000      1000      ACRES      ACRES       NOT
Unused acres  0           900        1000         426       780       USED       AVAIL       USED
------------------------------------------------------------------   ----------------------------
Acres         100         100        0            574       220       994        1000        6
------------------------------------------------------------------   ----------------------------
                                                                         Crop Resources Used
------------------------------------------------------------------    --------------------------------------
                          Crop Resource Requirements Per Acre                    Total       Start       Ending
              FABA        BAR/       BARLEY       CANOLA   WHEAT                 Usage       Inven.      Inven.
------------------------------------------------------------------   ----------------------------------------
Operating     $124.15     $93.00     $93.13       $97.15   $102.55    Operating  100000      100000      0
Spring Hrs.   0.42        0.33       0.42         0.44     0.33       Spring     400         400         0
Fall Hrs.     1.31        1.07       0.99         0.96     1.07       Fall Time  1020        1100        80
------------------------------------------------------------------      ------------------------------------
```

What's Best! has determined that by reducing the number of acres of canola, and putting in some wheat, we will make $917.18 more. We also use all the operating funds, and the spring hours. Why will putting in less of our most profitable crop make us more money? The answer is simple -we get to use more of our land. In the first example, we had 62 acres of unused land, but in the optimised solution, we have only six acres of unused land. This creates a greater total profit. What's Best! eliminated the need for us to try out many different combinations.

What's Best! can also be used to solve Least-Cost rations, and many other agricultural problems. All that is required is the proper Lotus 123 spreadsheet model.

What's Best! is not the only program of this type, but it is the only one that we have had the opportunity to look at. We will also be trying Optimal Solutions from Enfin Software Corp., and will let you know how it compares to What's Best!.

Another valuable service offered by RBBS.

FARMING FOR THE FUTURE - REPORT SUMMARIES AVAILABLE THROUGH THE RBBS

Looking for the latest agricultural research information in Alberta? Need that information right now? The Compu-Farm Remote Bulletin Board System (RBBS) now has report summaries on-line from the Farming for the Future On-Farm Demonstration Program. The project summaries were derived from reports submitted to Farming for the Future for projects completed by November 1986.

More than 130 On-Farm Demonstration Report summaries are available through the RBBS. Reports are organized into eight categories including Cereals and Oilseeds, Crop Protection/Apiculture, Engineering, Forages, Land Use, Non-Ruminants, Ruminants and Special Crops. Each of these reports have been listed in a file called FFTF.DIR which you can download and store for your reference. For those new to the RBBS, this main file can be quickly and easily downloaded (after accessing the Remote Bulletin Board System) by entering **F** to access the file section of the RBBS, followed by: **D;FFTF.DIR**. A sample from the downloaded file is shown below:

1. Cereals and Oilseeds

82F002-1, Wheat and Barley Varietal Trials (Stubble)
82F003-1, Wheat and Barley Varietal Trials on Summerfallow
82F005-2, Evaluation of Spring-Seeded Norstar Winter Wheat as a summer pasture
83F020-2, Winter Wheat Production in a Continuous Crop Rotation in South Central Alberta and so on ....

To download a specific report enter D;filename and follow the instructions that appear on the screen. For example, to download the report on winter wheat production, enter D;83F020-2.

An exciting new feature that will be available next month on the RBBS will be the ability to search for specific reports by topic area or keyword. For example, if you wanted to search for research reports dealing with alfalfa pollination with leafcutter bees, you could use "alfalfa", "pollination", or "bees" to get a listing of reports containing those keywords.

Copies of the complete project reports are available from Alberta Agriculture's Research Division. To obtain technical details from an individual project please contact the project co-ordinator whose address is given at the end of the project summary.

The On-Farm Demonstration Program was established in 1982 by the Agricultural Research Council of Alberta as a part of Farming for the Future. Funds are allocated through the Alberta Heritage Savings Trust Fund.

Farming for the Future's objectives are to help improve the long-term viability of Alberta's agricultural industry, and to help improve net farm income in Alberta. As part of Farming for the Future, the On-Farm Demonstration Program aims at intensifying and accelerating the transfer of new technology to producers.

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Provides a relevant example for users as well as serving a reminder of what's available on RBBS.

OUR REMOTE BULLETIN BOARD SEARCHES ITS DATABASE FOR YOU

Last month we introduced Alberta Agriculture's Farming For The Future (FFTF) On-Farm Demonstration Program project summaries available from our Remote Bulletin Board (RBBS), and described how to download these project summary files. This month, we will discuss an exciting new feature of the RBBS - how to search through an ocean of FFTF project summaries for specific topics (or, Cutting Through the Information Jungle).

Quickly reviewing last month's RBBS article: there are more than 130 On-Farm Demonstration Project Summaries available on the RBBS. Each report summarizes the research findings of a particular On-Farm Demonstration project. Projects are organized into eight different categories including Cereals and Oilseeds, Forages, Ruminants, and Special Crops, to name just a few.

Each report summary is a separate file which you can download from our RBBS to your computer. For example, you could download 82F003-1, a report on Wheat and Barley Varietal Trials on Summerfallow. To get a complete list of all 130-plus files, simply download the file FFTF.DIR (see last month's Compu-Farm for details on file downloading). Problem: who wants to go through 130-plus reports to find information on a particular topic? Solution: design a "search" capability into the RBBS, so it can do the work for you. We do this with the help of a database and a feature called "Doors."

DEFINITIONS: A database is a collection of data. One way of using a computer to search a database is to match a keyword with information contained in the database. A keyword is some word or topic which you use to tell the computer what you want to search for. You make up the keyword, be it BEEF, LETTUCE or TOMATO. A door allows a user to run programs through the RBBS provided that their communications program can handle standard ANSI terminal codes (we suggest PROCOMM).

All Farming For The Future On-Farm Project summaries are stored in our computer as a database. You can search this database through the RBBS for specific reports based on a keyword. You make up the keyword according to what type of information you want to search for. BEEF, for example, is a keyword that you would use when searching for reports that refer to beef. Please note, that for the purpose of this article, all keywords will be in capital letters. The computer will accept either upper or lower case letters as keywords. To the computer, beef is the same as BEEF.

HOW IT WORKS: Connect to the RBBS as usual. From the main Command line, select D for DOORS. Next, select the FFTF doorway. This doorway will take you through to a customized program designed to allow you to search the database. Our host computer will then set up the search program. It is ready for your search when you see this screen:

```
                         ALBERTA AGRICULTURE

              On-Farm Demonstration Program Project Summaries

         This program will allow you to search for KEYWORDS anywhere in
         the database.  It will give you a list of project numbers that
         have the keywords in them.  You may then use this list to download
         the appropriate files from the RBBS.


   PRESS RETURN TO CONTINUE ...
```

SCREEN 1

After pressing the return key, the computer will prompt you to either perform a search or to quit and return to the RBBS. You should enter 1 to search the database in this screen:

```
      Do you want to 1) search the database?
                     2) quit and return to the RBBS?

      Your choice?   1
```

SCREEN 2

When you enter 1 and press return, the computer will prompt you to enter the keyword. For example, if we wanted to search for any On-Farm Demonstration Project summary dealing with beef, we would enter the keyword BEEF. To illustrate:

```
         Enter keyword     ___________   e.g. BEEF

         (A keyword is any word that you are interested in finding.
         For example, if you were interested in all summaries that
         contained the word BEEF, you would enter the keyword BEEF.)
```

SCREEN 3

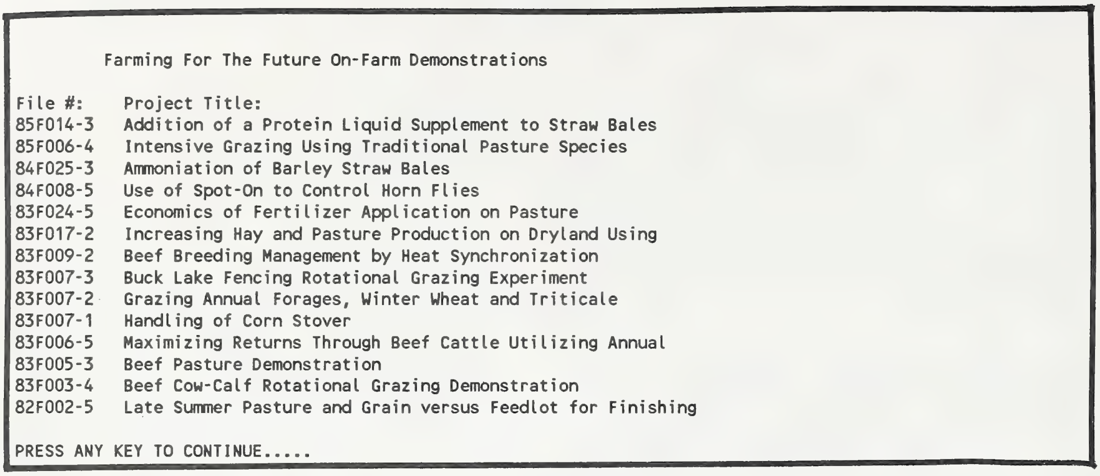
The computer then searches for all reports containing the keyword BEEF, and results are displayed as follows:

```
         RESULTS OF SEARCH FOR KEYWORD:   BEEF
         There were  14 matches found

         File is being written to disk using the name FFTF.SUM
         You may download this file from the FILES section of
         the RBBS after closing this door.

      Do you want to:  1) Display results on screen?
                         2) Continue?

      Your Choice:     1
```

SCREEN 4

As you can see, results are stored in a downloadable file called FFTF.SUM, and can also be displayed on your screen. Please note that this file is available only during your current sign-on. It is deleted when another RBBS user begins a keyword search.

Selecting option 1 displays the results of our search as follows:



```
        Farming For The Future On-Farm Demonstrations

File #:    Project Title:
85F014-3   Addition of a Protein Liquid Supplement to Straw Bales
85F006-4   Intensive Grazing Using Traditional Pasture Species
84F025-3   Ammoniation of Barley Straw Bales
84F008-5   Use of Spot-On to Control Horn Flies
83F024-5   Economics of Fertilizer Application on Pasture
83F017-2   Increasing Hay and Pasture Production on Dryland Using
83F009-2   Beef Breeding Management by Heat Synchronization
83F007-3   Buck Lake Fencing Rotational Grazing Experiment
83F007-2   Grazing Annual Forages, Winter Wheat and Triticale
83F007-1   Handling of Corn Stover
83F006-5   Maximizing Returns Through Beef Cattle Utilizing Annual
83F005-3   Beef Pasture Demonstration
83F003-4   Beef Cow-Calf Rotational Grazing Demonstration
82F002-5   Late Summer Pasture and Grain versus Feedlot for Finishing

PRESS ANY KEY TO CONTINUE.....
```

SCREEN 5

You may continue to search the database with different keywords or close the "Door" and return to the main RBBS command line. Remember, you can obtain the results of your search by downloading the file FFTF.SUM from the RBBS file download section. In addition, you can go on to download the actual project summary file, for example, 84F025-3, Ammoniation of Barley Straw Bales.

Please note that copies of the complete project reports are available from Alberta Agriculture's Research Division by contacting the project co-ordinator whose address is given at the end of each project summary.

The On-Farm Demonstration Program was established in 1982 by the Agricultural Research Council of Alberta as a part of Farming For The Future. Funds are allocated through the Alberta Heritage Savings Trust Fund.

Sorting through large volumes of information in a very short time is another illustration of the power available to today's computer users. We encourage you to try out this new search feature. We are very interested in any comments and suggestions so that we can continue to refine and improve the RBBS.\•H

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AGRICULTURAL SOFTWARE DIRECTORY NOW AVAILABLE ON RBBS

Last month we showed you how to search through our Remote Bulletin Board System (RBBS) and download the Farming For The Future project summary files. This month, the Agricultural Software Directory has been added to the RBBS and is ready for you to access.

The Agricultural Software Directory is a compilation of over 600 agriculture related software packages available from over 130 manufacturers across Canada and the United States.

All the software packages in the Directory are stored in a database on our computer. By leading you through a series of questions regarding your agricultural and equipment requirements, the computer will search its database to find the software packages available that meet your needs.

To run the program, connect to the BBS as usual. From the main Command line, select D for Doors. Next, select the Agricultural Software Directory door. This door will take you into a program that allows you to search the Directory database. When our computer has set up the program, it will show that it is ready for your input with the following screen:

```
                    AGRICULTURAL SOFTWARE DIRECTORY

          The Agricultural Software Directory is a compilation of over
          600 software packages available from over 130 manufacturers.

          This program will aid in finding software packages specific
          to your agricultural needs and equipment.

          Press return to continue.
```

SCREEN 1

When you have pressed the return key, a screen requesting major interest category choices will appear. If, for example, you are interested in searching for Financial Record Keeping software, enter the number 1 at the prompt line and press return.

```
                    AGRICULTURAL SOFTWARE DIRECTORY

          Here are the major categories available:

     1)   Financial Record Keeping
     2)   Physical Record Keeping
     3)   Nutrition/Ration Analysis
     4)   Decision Aids
     5)   Communications
     6)   Marketing
     7)   Agro-Electronics
     8)   Land Management

     Input the number (1 - 8) for your choice:  1
```

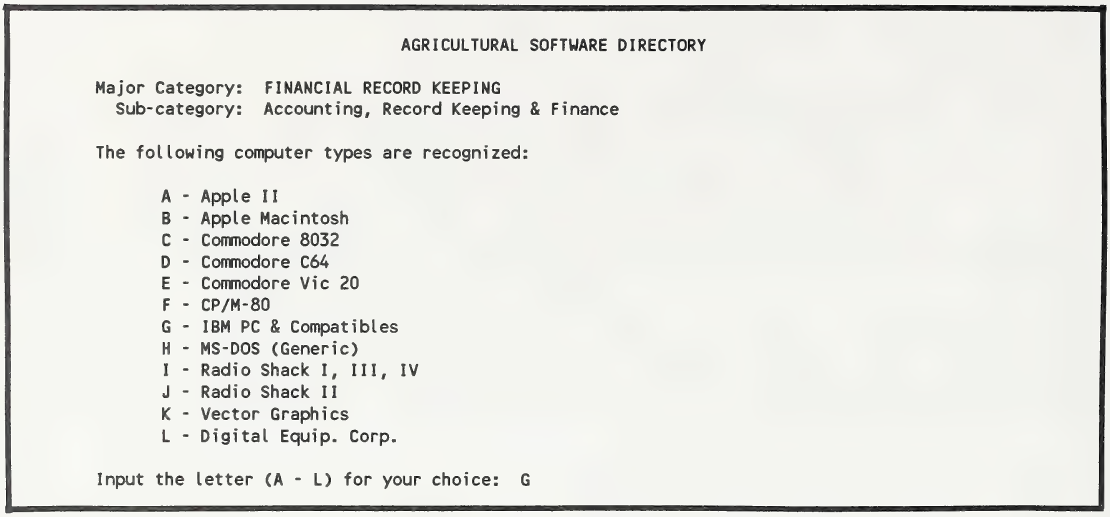
SCREEN 2

The next screen (Screen 3) lists different types of financial record keeping packages available in the database. If, for example, you were looking for accounting packages, you would enter the number 1 and press return.

```
                    AGRICULTURAL SOFTWARE DIRECTORY

     FINANCIAL RECORD KEEPING

     Here are the sub-categories available:

          1)   Accounting & Record Keeping & Finance
          2)   Equipment & Machinery
          3)   Farm Management
          4)   Farm Supplies
          5)   Inventory
          6)   Produce & Shippers
          7)   Tax Planning

     Input the number (1 - 7) for your choice:  1
```

SCREEN 3

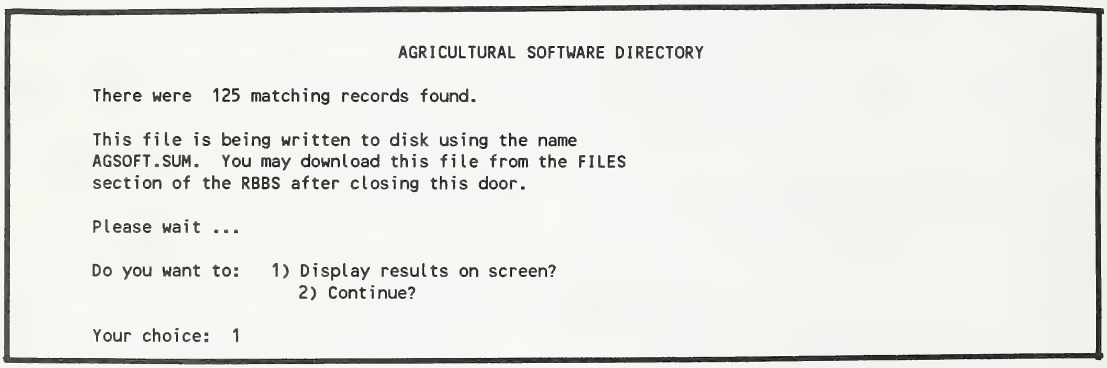
The computer then prompts you with a screen to input which machine type you wish the software to run on. In our example, we will use the letter G, for IBM PC and Compatibles.



```
                    AGRICULTURAL SOFTWARE DIRECTORY

Major Category:  FINANCIAL RECORD KEEPING
  Sub-category:  Accounting, Record Keeping & Finance

The following computer types are recognized:

       A - Apple II
       B - Apple Macintosh
       C - Commodore 8032
       D - Commodore C64
       E - Commodore Vic 20
       F - CP/M-80
       G - IBM PC & Compatibles
       H - MS-DOS (Generic)
       I - Radio Shack I, III, IV
       J - Radio Shack II
       K - Vector Graphics
       L - Digital Equip. Corp.

Input the letter (A - L) for your choice:  G
```

SCREEN 4

The computer will now search its database to find any accounting software packages which will run on IBM's or compatibles. When the search is complete, the following screen appears:

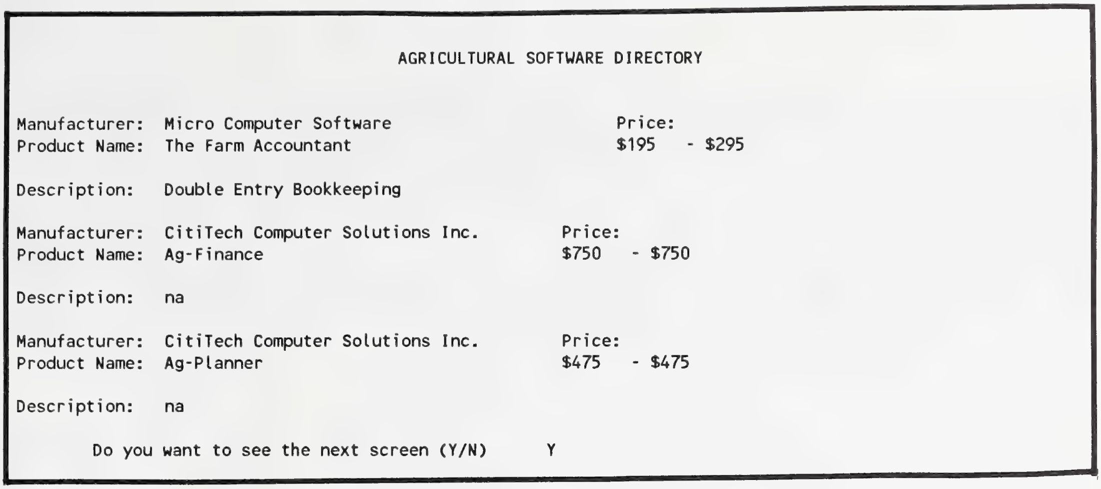


```
                    AGRICULTURAL SOFTWARE DIRECTORY

There were  125 matching records found.

This file is being written to disk using the name
AGSOFT.SUM.  You may download this file from the FILES
section of the RBBS after closing this door.

Please wait ...

Do you want to:   1) Display results on screen?
                     2) Continue?

Your choice:  1
```

SCREEN 5

The results of your search are stored in a file called AGSOFT.SUM which may be downloaded before ending your session on the RBBS. Also, if you wish, you may see the results of your search on the screen. You should note, however, that this file will only be available as long as you are signed onto the RBBS. If you exit from the RBBS without downloading this file, it will be deleted the next time the Agricultural Software Directory program is run.

Select the number 1 to display the search results on screen. The results are displayed in the following format:



```
                         AGRICULTURAL SOFTWARE DIRECTORY


Manufacturer:  Micro Computer Software                   Price:
Product Name:  The Farm Accountant                       $195    - $295

Description:   Double Entry Bookkeeping

Manufacturer:  CitiTech Computer Solutions Inc.     Price:
Product Name:  Ag-Finance                           $750    - $750

Description:   na

Manufacturer:  CitiTech Computer Solutions Inc.     Price:
Product Name:  Ag-Planner                           $475    - $475

Description:   na

       Do you want to see the next screen (Y/N)      Y
```

SCREEN 6

If you wish to see following screens of information, enter Y at the prompt; if not, enter N for No.

You may continue running the program to search for more agricultural software, or you may exit from the program and return to the RBBS main Command line. Remember to download the saved AGSOFT.SUM file from the Files download section before leaving the RBBS if you want to have a permanent record of this file.

The Agricultural Software Directory was first published in October, 1985. The information available on the RBBS is the most recent we have. If you are interested in more information regarding any of the packages found in the Directory, please contact the manufacturer directly.

TAX REFORM AND THE FARM COMPUTER

"One of the major recommendations for farmers in Federal Finance Minister Michael Wilson's tax reform package, involves an overhaul of the present accounting and tax system for farmers." says Merle Good, farm tax specialist with Alberta Agriculture. "It appears that the farm community will be faced with modified accounting rules whereby the previous cash base accounting system will be required to be modified to a simplified accrual basis."

Debits, credits and accrual accounting have often been considered "dirty words" by some farm business managers. Now, because of these proposed tax changes, many people may be looking to computers to help them manage their books and to avoid learning the meaning of these words.

Using this rationale to justify the purchase of a $2500+ computer system may not hold water, however, since there are other alternatives to consider. We could hire the services of a competent bookkeeper to make monthly entries for about $500 per year. We could then take these fully prepared books to a qualified accountant who would give us personalized tax advice and cost about $250. Our total cost would be about $750 per year.

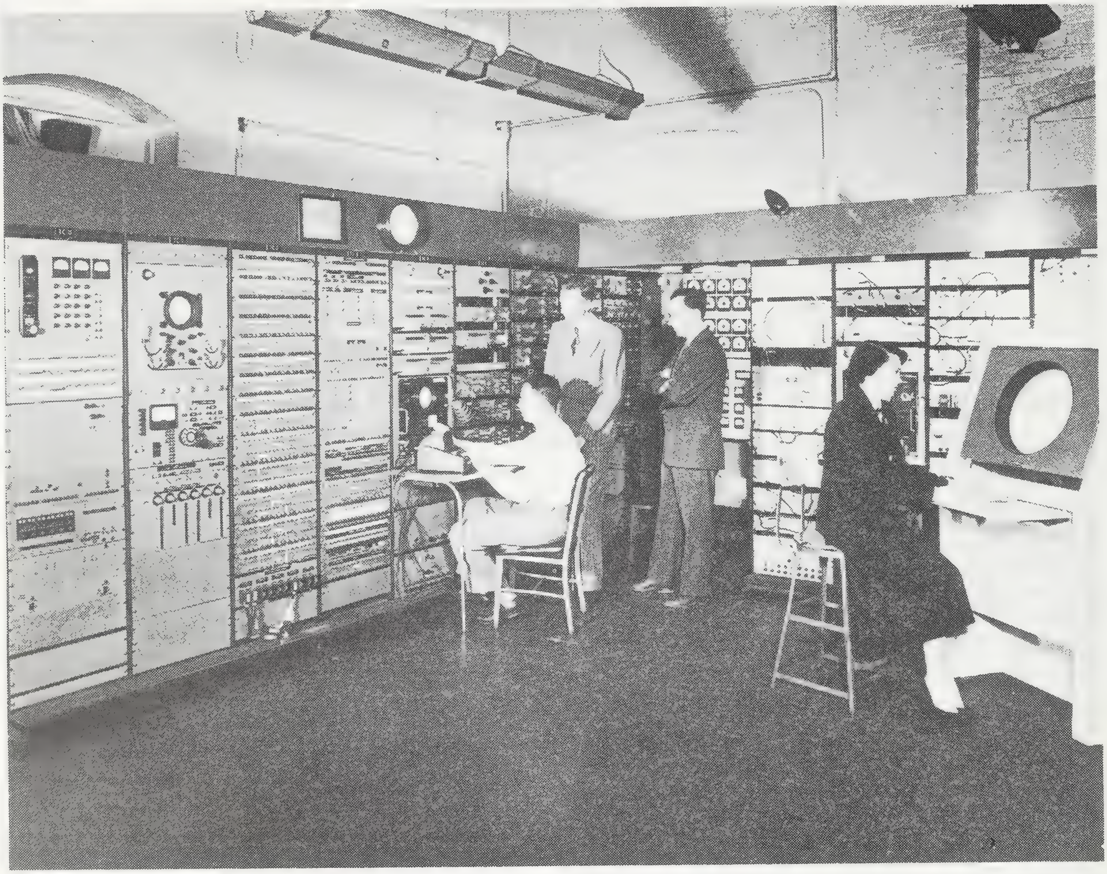
The computer system, on the other hand, will cost about $230 per year in paper, disks, ribbons, repairs, etc., so we have a net savings of $750 - $230 = $520 per year. Capitalizing this at 12 per cent interest, we get a pay-back period of almost eight years and have made no allowance for our own time!

To obtain the maximum benefit from any financial management system, double-entry accrual accounting is a requirement. The real benefit of using a computer system to manage our books will come through basing management decisions on the wealth of timely information that can be derived from a good set of accrual books.

The success of any job depends on taking the time to get the proper tools together. Sharp tools always help to do the job better.

INTRODUCING THE COMPU-FARM RBBS COMPUTER???

(The Whirlwind Computer, 1951)



left to right: Bruce Waldie, Mark Olson, Paul Gervais, Beth Lausen
(Stephen Dodd, Jay Forrester, Robert Everett, Romana Ferenz)

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VOLUME VIII, NO. 7, SEPTEMBER, 1987

PC BANK - A FINANCIAL CALCULATION PROGRAM

PC BANK Version 1.0 is a multi-function financial program which is designed for use in the home or office. Some of the features available in this program are the ability to calculate the future value of investments, interest rate on investments, payment schedules, principal, last payment, balance, term, interest rate on loans, payment schedules, comparisons, and terms on mortgages.

One of the potentially convenient features of the program is the ability to "link" the results of one calculation to a subsequent calculation. For example, finding out how much we would have to deposit into a savings account each month for twenty years so that we would have enough invested to make monthly withdrawals of $800 for twenty years after that.

To perform this calculation, we first enter the amount of each withdrawal we want to be able to make twenty years from now. We then enter the interest rate we think the money will be making at the time of the withdrawals and how many withdrawals a year we will be making. The program will then calculate the minimum investment required to be able to do this. In our case, this is $111,664.62.

We then need to determine how large a deposit we need to make each month in order to have accumulated $111,664.62 in twenty years. To do this, we need to link to the Regular Deposits program and enter the total value of our investment ($111,664.62). Answering the questions that follow this entry regarding interest rate and number of deposits per year that we will be making, we find that we need to deposit $241.68 each month. We also learn that we will earn a total of $53,361.42 interest from our investment.

While we found this feature to be useful, it could be improved by allowing the calculations from the Regular Withdrawals section of the program to be automatically input into the Regular Deposits section. As the program runs now, you must manually reenter the calculations.

PC BANK was written using Turbo Pascal Version 2.0 and claims to be accurate to eleven digits. (However, Turbo Pascal Version 3.0 has been available since 1985, and there is even a special BCD version which would prevent all rounding errors.) To use the program you must have an IBM PC or compatible with 128k of memory, double-sided disk drive and color/graphics or monochrome adapter. The program is not copy-protected.

The manual is marred by being incomplete and poorly written. For example, the concept of effective interest rates is introduced without any explanation of what an effective interest rate is. Many of the sample screens in the documentation are incomplete; therefore the user must have a good basic knowledge of banking terms and procedures to be able to complete the input required. There is no section in the documentation to describe what each of the functions at the bottom of the individual screens do, making it difficult for the user to understand and use them effectively. There are also many spelling errors in the manual and on the screens (e.g. withdrawals).

PC BANK does not detect an off-line printer, or a printer which is out of paper. This results in the program crashing to DOS. The program insists on saving data files to the A: drive, even if another drive is specified, and will not detect an open drive door, once again resulting in the program crashing.

Input from the keyboard is inconsistent. At certain times, ENTER has to be pressed after information is input; at other times the program will continue on to the next step automatically, making it necessary for the user to be very cautious. The program does not utilize the arrow keys. There is no opportunity given to correct input errors. We had to continue through the option and repeat the entire option if a change was required.

Calculations are rapid and precise. However, we did find an error when the program was asked to calculate the term of a mortgage. We had entered a mortgage of $80,000 and an annual interest rate of 12 per cent. We then told the program that we wanted to make payments of $500 each month and that it was to calculate the number of payments it would take to pay off the mortgage. After performing the calculations, the program came up with a term of 4.95 years, which is incorrect, as monthly payments of $500 will never retire a $80,000 loan. The program should have displayed an error message on screen.

PC BANK is available from Sargent Software, Box 856, Red Deer, AB, T4N 5H3. It sells for $49.95. Financial calculators sell for less.

VOLUME VIII, NO. 8, OCTOBER, 1987

Provides farmers with an insight into the different sectors involved in the development of software. Presents a look at the total picture rather than just the end product.

REPORT FROM THE ASSOCIATION OF AGRICULTURAL COMPUTING COMPANIES (AACC) ANNUAL CONFERENCE

MINNEAPOLIS, MN - The Association of Agricultural Computing Companies (AACC) passed two resolutions calling for increased cooperation between the private sector, government extension and public universities. These resolutions were passed during the joint AACC and Midwest Technology Development Institute (MTDI) conference on Innovations in Agricultural Computing held in Bloomington, MN, October 18-20. As part of Alberta Agriculture's Management Technology Unit, I was pleased to be able to attend this important event and to pass my observations on to you.

The Innovations in Agriculture conference focused on exploring opportunities for private industry, government and universities to cooperate in the development of agricultural computer products, in particular, agricultural expert systems. The AACC is a professional trade association for companies involved in agricultural computer-based products. The MTDI was formed as a result of a cooperative effort among several midwest state governors to enhance cooperative research and development between private industry, universities and government.

The annual AACC conference provides a meeting place for both private companies and public institutions to gather and discuss issues and concerns relevant to the US agricultural computer industry.

Some of the questions addressed by conference participants included:

- How does the private sector identify which products to develop and how does it evaluate the marketplace?
- How can universities cooperate with industry?
- How can universities maintain objectivity and credibility while involved in cooperative marketing/development efforts with private companies?
- How can the industry effectively deal with

the issue of product liability?

The conference was attended by over 115 participants from private industry, the public sector and the US Department of Agriculture. Speakers included: Vivan M. Jennings, Deputy Administer, Agriculture Programs, USDA, Extension Service; Dr. William Tallent, Assistant Administrator, USDA, ARS, OCI; and Stephen A. Burhoe, Editor, Doane's Agricultural Computing. In addition, Dave McEwen, Product Manager for Trade Link, C-I-L Canada Inc., spoke on agribusiness computing needs and provided a Canadian perspective to an otherwise US-oriented conference.

The conference keynote speaker was Dr. Paul Johnson, professor at the Carson School of Management, University of Minnesota. Dr. Johnson discussed how expert systems are changing the way that computers are applied to problem-solving, and in particular, how expert systems can be applied to agricultural management.

For readers unfamiliar with expert systems, consider this: an expert system is a program designed to apply decision-making rules used by human experts (heuristics) to a problem. Specifically, expert systems are designed to solve what we call a poorly-defined or ill-structured problem. An example of a well-defined problem would be winning a game of chess - all the moves of the game can be calculated as the rules of chess are well-defined and definite. On the other side of the coin, an example of an ill-structured problem would be "My barley crop doesn't look right. What's wrong, and why?"

Dr. Johnson discussed the promises offered to agriculture by expert systems but warned conference participants of the perils and limitations of the current technology. Dr. Johnson stressed that one of the greatest problems in designing expert systems is the "paradox of expertise - the best experts are so advanced that they lose cognitive awareness of what they know - it becomes an art."

As well, several panel sessions and group discussions explored topics ranging from the computer needs of agribusiness and product marketing strategies, to the roles of the public and private sectors in research, product development, marketing, support and user education.

The optimistic mood of the conference reflected the general upswing in US farm computer product sales over last year. In a survey conducted by the AACC of its member companies, it was revealed that farm computer product sales are up eleven per cent compared to this time last year.

One of the conference speakers, Mr. Gary Randolph, president of Harvest Computer Systems, felt that there are two main reasons for an increase in farmers using computers in the US. He indicated that more farmers are now using computers as the recession of the early-mid 1980's caused many farmers to sharpen their financial management skills. "A totally different type of farmer exists today than ten years ago," he said. "Now, they are looking more closely at the numbers, and computers are helping do that."

Mr. Randolf noted that a second reason for the increase in farm computerization is directly related to the complexity of current US government programs. "Farmers are using computers to analyze the financial results of the (US) government's programs and to handle the complex accounting associated with it." As a result, Mr. Randolf predicts that computer growth in the US farm and agribusiness market will increase.

Another speaker, Mr. Raymond Schroer, Marketing manager for Farm TABS Division of Terra International, Inc., agreed with Gary Randolf. "Each year, the number of farmers owning a computer will increase about 20 per cent," he predicted. That figure is based on an estimated 12 - 15 per cent of the farmers in the US now owning a computer, according to the AACC. Mr Schroer told the association, "A minimum of 25 per cent of farmers will own computers by 1995." He added that this is in part due to better, easier-to-use software and hardware now available for the first-time user.

The AACC survey found that 56 per cent of the software sold in 1986 was for agricultural accounting, 19 per cent for crop and livestock analysis, and three per cent for agricultural decision aid software. The balance of agricultural software sold was mixed among herd management and related agribusiness software.

The survey also indicated that among the companies surveyed, a significant future growth for agricultural computer products would be in the agribusiness, lending and professional accounting market areas. In addition, the survey listed several factors related to increased farm computer product sales, including: a better farm economy, more farm computer education and awareness, better trained dealers and better products for the farm market.

Steven Burhoe, editor of Doane's Agricultural Computing, an industry newsletter, reported that their farm subscribers with computers average $133,000 in gross sales per year. "They also average spending about $4,320 on hardware and 1,725 on software."

Dr. Jim McGrann, a professor at Texas A&M University, foresees steady growth in the farm computer market. "Farmers and software companies have made great strides. There are quality products with good service available and farmers are adopting the microcomputer for farm use." he said. "The industry is only ten years old and growing, but we have found that the computer is a very useful and profitable tool on the farm. How useful depends as much on the farmer's skills as the software and the company providing it." Dr. McGrann also indicated that for computers to become even more useful, user education will continue to be a key factor.

The conference closed with the AACC annual meeting where two resolutions were passed calling for increased cooperation among the public and private sector. In passing these resolutions, the AACC recognized the important roles of universities and government institutions within the public sector. These roles include research into new technology, user education, decision aid development and support. In addition, the AACC considers the roles of the private sector to include developing, marketing and providing long-term support of new products, as well as product refinements and enhancements in response to the marketplace.

Although the AACC actively supports the formation of joint ventures with the public sector to bring new technology into the marketplace, the AACC wishes to discourage the commercial marketing of agricultural computer products by the public sector. However, the AACC also acknowledges that the public sector provides an important service in making available various spreadsheet templates and related programs that are unprofitable for the private sector to produce, market and support. These two resolutions are as follows:

1) Resolved that the Association of Agricultural Computing Companies (AACC) suggests that the public universities and their Extension Services cooperate more effectively with the private sector, capitalizing on each others strengths, not duplicating each others efforts, thereby increasing the overall productivity of providing computer-based products and services to agricultural producers, agribusinesses and rural-based businesses.

2) Resolved that the Association of Agricultural Computing Companies (AACC) encourages the formation of public/private cooperative ventures in which the education and research capabilities of the public institutions are combined with the marketing and support capabilites of private companies for the development and marketing of agricultural computer-based products. The AACC encourages expanded education efforts, decision aid development and support by universities. The AACC discourages the competitive marketing of agricultural computer-based products either directly by public universities and extension or by shell organizations created or endorsed by the university for that purpose.

These resolutions may have some impact on the Canadian agricultural software industry as the effects of cutbacks, privatization and industry pressure causes the public sector to rethink its software research, development and distribution policies. However, what works in the US is not always an automatic solution in Canada.

VOLUME VIII, NO. 9, NOVEMBER, 1987

Provides a good description of what is available in the market. Even though prices are out of date, the article does state some relevant points to be considered when purchasing a system.

COMPUTERS FOR CHRISTMAS

October and November are two of our favorite months because this is the time that we get to go to trade shows and computer stores to gather information for our annual COMPUTERS FOR CHRISTMAS issue of Compu-Farm. This is our sixth year of running this article, and it has also been one of the most exciting to prepare. The first year we did this (1982), we looked at ten different systems. It's interesting to note that only the Commodore 64 and the Radio Shack Color Computer are still being made, and neither of these are significant to the agricultural market anymore. Things have changed a lot since then!

The agricultural computer world has become dominated by the MS-DOS operating system. Over 85 per cent of the software listed in our Agricultural Software Directory is available for this operating system. Doane's Agricultural Computing Newsletter recently completed a survey of their readers and found that 78 per cent own IBM or compatible computers, followed by 15 per cent with Apple computers. Of those readers considering the purchase of a computer, 88 per cent were going to purchase an IBM or compatible. We can only expect this trend to continue.

Buying a computer for Christmas often involves trying to satisfy three needs. You want to have a machine for the kids to play games on (it is Christmas after all); you want a machine that will help them in their school work, and you want a machine that you can use in your farm business. However, since each of the home, school and business worlds are dominated by different standards, it is almost impossible to satisfy all three needs. We are assuming that you have set your priorities on the farm business first, with home and school following.

We consider this to be a watershed year as far as hardware is concerned. In April, IBM announced their new line of PS/2 computers. This summer they also announced that they will no longer be making PCs or XTs. IBM ATs are getting very difficult to obtain, and few people expect the supply to last much longer. This brings up an interesting point: can a computer be a compatible if the computer that it is compatible with is no longer being made? This year also marked the final arrival of the Macintosh II and the Amiga 2000 with bridge card, both of which can run MS-DOS as an option.

In the past, we have tried to cover the entire market and rate each of the systems on their applicability to agriculture. We then broke the systems into three major catagories: under $1400, between $1400 and $2400, and over $2400. This year, however, due to the changes we have seen over the past six years, we are going to divide computers into two areas: strict compatibles and the new systems.

THE COMPATIBLES

This very large group of computers represents machines that will get the job done now, and likely for a long time to come. There are literally millions of these types of machines installed, so you can continue to expect support from a large number of software and hardware vendors. It starts at the low end with machines literally built in someone's garage and ends with machines that have the power and capacity that only "power users" are likely to need.

Prices have continued to be reduced from previous years. This means that you can either get the same system for a lower price, or you can afford to get more power for the same price. Unless otherwise noted, our definition of a basic system includes the computer, one disk drive, printer, and monitor. A "full blown" system includes computer, a full complement of memory, one floppy disk, one hard disk (if available), a printer, and a color monitor. Since there are so many brand names in this category, we cannot mention them all; instead we are using some of the higher profile machines as yardsticks against which you can measure your proposed purchase.

"NO NAME" COMPATIBLES - Basic systems are available for about $1800, which is a reduction of $300 from last year. The quality of the compatibles that we have seen is generally improved from last year. You should still be concerned with the reliability of ongoing warranty and repair service and whether or not you get all the "original" manuals and disks.

TANDY 1000 SX - This is an update on the old Tandy 1000 and almost all of the reservations that we had about the old 1000 have been fixed. The SX will still only accept boards that are no longer than ten inches (most compatibles accept 13 inch boards), and it still doesn't have parity checking. The board length is less of a problem than it used to be because the SX can now have its full complement of memory (640k) on the motherboard. The lack of parity checking means that a stray cosmic ray (or power blip) could change the contents of your memory, and the computer would never know. Most compatibles have parity checking. A basic system is on sale for Christmas for $1589 and a full blown system is $3198.

TANDY 1000 EX - This system is new for 1987 and is aimed at the home and school market. Its main problems are a non-standard expansion bus and lack of DMA (unless you add the memory expansion). The main concern here is that you have to buy all your expansions from Radio Shack since no-one else makes them. A basic system starts at $1099, and a full blown system is $1780. A hard disk is not available.

COMMODORE PC10-II - Is a PC compatible that hit the market just prior to Christmas last year. This year, it is being upgraded to include an 80286 CPU running at 8Mhz and a built-in clock.

Tentative prices on a basic unit start at $1750 with a full blown one at $2600. We were not, however, able to find out if it uses 8-bit or 16-bit cards.

TANDY 1000 TX - This machine is an enhancement of the SX. It basically just uses an 80286 CPU instead of an 8088 and 3.5 inch drives instead of 5.25 inch. It still uses 8-bit option cards, however, so it is not offering "true 16-bit technology".

TANDY 3000 (AND 3000 HL) - These two machines are very similar to each other, differing mostly in disk drives and CPU speeds. A basic system starts at $3000 topping out at $5700 for a system with a 20Meg hard disk.

NEW SYSTEMS - POWER SYSTEMS

This group of machines offers either features and/or power that is far beyond what the normal user will need now, or are non-standard enough that they require a special classification (for now). What is overkill now is likely not to be in the future, however, so here goes:

IBM PS/2 MODEL 25 - We had the opportunity earlier this month to use one of these machines and will publish a full review on it next month. The basic system retails for $2395; however, some dealers may sell for less. The use of 3.5 inch diskettes, rather than the (up to now) standard 5.25 inch will cause some initial problems but is expected to be the wave of the future.

IBM PS/2 MODEL 30 - Is the slightly bigger brother to the Model 25. It has more slots (i.e. expandability) but otherwise seems to be the same system as the model 25. The basic unit with monochrome monitor costs $3284, and the full blown system (with 20Meg hard disk) is over $4800. The Model 30 offers more future expansion over the model 25, and still accepts normal expansion boards.

IBM PS/2 MODELS 50, 60, 80 - These are the true members of the PS/2 line, since they have a bus (called the Microchannel) and will run the upcoming OS/2. These machines will be of more interest to the "power user" and offer more performance (and price) than the average agricultural user needs. A Model 50 starts at $5884 and the top of the line Model 80 is well over $15,000. Santa, are you listening?

TANDY 4000 - New for 1987 and uses Intel's powerful new 80386 chip. This machine is for the true "power user" only and a full blown system will cost over $7500!

AMIGA 2000 WITH BRIDGE CARD - The Amiga immediately caught the fancy of the kid in us when we first evaluated the 1000 in October of 1986. Commodore has now released the Amiga 2000 which, with the MS DOS BRIDGE card, allows you to run virtually all MS DOS software. We tried one for about 30 minutes and experienced no problems with it. A basic system starts at $4000 (including color monitor), adding a hard disk, etc. brings the total to about $4600.

HARDWARE REVIEW IBM PS/2

In April 1987, IBM introduced their new line of personal computers dubbed the PS/2's. At that time they introduced the models 30, 50 ,60 and 80. Then, in August they introduced the model 25. We have now tested these machines and would like to give our impressions of how they fit into the world of agricultural computer users.

The models 50, 60 and 80 have a new bus called the Micro Channel Architecture (see the April 1987 Compu-Farm for a better description of this). The main item of importance here is that none of the existing option boards for regular PCs will work in these machines. Entirely new boards are required and since there are not that many manufacturers in the market yet, they tend to be a little more expensive than PC boards. The MCA does, however, offer a much improved performance over the older bus design.

The models 25 and 30 have a normal bus so regular boards can be used (as long as they are no thicker than 0.8 inches). The 30 has three slots and the 25 has two (actually one full length slot and one half length slot). It is important to note, however, that the PS/2s have the video, parallel, serial and disk drive adapters built into the motherboard, so no slots are taken up by any of these features. The model 25 has been criticized because it was thought that a hard disk could not be installed. This turns out not to be true. We had no problem installing a HardCard 20 in the "short" slot of the 25 we used.

All of the PS/2s have a new video standard. The 25 and 30 have what is called the Multi Color Graphics Adaptor (MCGA), and the 50, 60 and 80 have the Video Graphics Array (VGA). These all offer higher resolution than before (up to 640 by 480) and differ mainly by the number of colours that can be displayed at one time. One major difference from previous PCs is the use of analog monitors, and not TTL monitors. Analog monitors offer better resolution and more colours, but generally cost about $400 more. Perhaps the most striking feature of the model 25 is the fact that the monitor is built-in.

All of the PS/2s run faster than their predecessors. For the model 25 and 30 this is due to the use of an 8086 running at 8MHz instead of an 8088 running at 4.77 MHZ. The 50 and 60 have an 80286 running at 10MHz instead of 8MHz. The 80 uses a 80386 running at either 16 or 20 MHz. Our tests of the 25 and 30 showed them to be actually 1.6 times faster than a stock PC.

All of the PS/2's use 3.5 inch diskettes instead of the former 5.25 inch disks. These 3.5 inch disks are much more durable than the 5.25 inch and hold from two to four times more data. Many manufacturers seem to be changing over to this 3.5 inch size, and there is little doubt that this size will become the new standard. Many software packages are now being supplied with both sizes, but agricultural software has not been as quick to adapt. This means that there is likely to be a short term problem getting software in the 3.5 inch format. For example, we are unable to supply our BASIC programs and spreadsheet templates in that size.

The model 25 is available with two different keyboards. One is the new standard "enhanced" keyboard which is the same as what the AT model 339 came with. It has separate number pad and cursor keys, and is about 19 inches long. The other keyboard is the "space saving" keyboard that places the number pad on top of the character keys. Anyone who is used to a number pad for entering large amounts of data will probably find this keyboard awkward, so we would recommend the enhanced keyboard. All the rest of the PS/2s come with the enhanced keyboard.

Now comes the question - are any or all of these new computers of significance to the agricultural market? The answer is absolutely maybe!

The base model 25 retails at $2095 and since that includes the built-in monitor, all you have to add is a printer. Some dealers sell for significantly less, so we expect that this machine will attract a significant number of buyers. It offers a small neat package, good speed and graphics for a good price. As long as you are willing to work around the disk size problem for a while (until the world catches up), it would be a good machine to own.

The model 30 starts at $2,595. Add a monochrome monitor for $389 and a printer and you have a good system, but at a higher cost than many AT compatibles. To many people the security of owning a well know brand name machine, coupled with the assurance of long term support and repair service is worth the extra cost.

The models 50 and up start to price themselves out of the beginner's computer market. For example, the 50 starts at $5495 (without monitor) but offers significantly more power than the 25 or 30. If you believe that the new OS/2 is the operating system for you and that speed is everything, then these machines warrant your further attention.

With the introduction of the PS/2 series of computers, IBM has once again challenged the compatible makers. Many of them are scrambling to pick up the challenge and plan to release their own versions of these machines. We are already seeing 3.5 inch drives on machines such as the Tandy 1000 TX, and many manufacturers are producing VGA compatible video boards. For myself, when I grow up, I want to own a model 80!

Special thanks to Ascot Business Systems, Edmonton, and in particular Siegried and Larry, for the loan of the model 25 and the use of the rest, along with their technical information.

WHEN DOES A COMPUTER PAY?

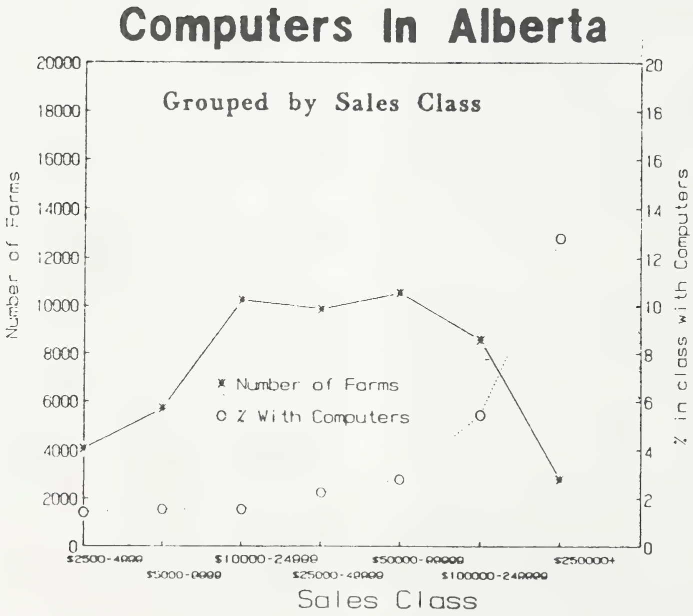
Last month, we presented a chart that showed how many farms across Canada said they had a computer that was used primarily in their farm business. While it can be interesting to note the differences between provinces, it does not really tell us much about what kind of farm can most use a computer.

One of the factors that can influence how much use a computer can be on the farm is the size of the farm and how much paper it has to handle. It can also be illuminating to make some comparisons between the typical small business and the average farm.

SMALL BUSINESSES - our own mini-survey of small businesses in Alberta shows that they typically have between 200 and 350 accounts in their general ledger (not including accounts receivable and payable sub-accounts). They also process between 2500 and 3500 transactions per year. With this size of business, it is not hard to see how a computer can be useful just as a paper handling device.

TYPICAL ALBERTA FARM - our surveys indicate that most non-computerized farms in Alberta have between 25 and 60 accounts and handle between 250 and 800 transactions per year. It is much less obvious here that a computer can be useful as a paper handling device. Once a computer is used, however, the number of accounts tends to increase simply because it is easier to keep more detailed records with a computer.

FARM SIZE - is an obvious factor relating to how much paperwork there is on any one farm. The accompanying chart shows the breakdown within Alberta for computer use in 1986. The number of farms using computers remains at a relatively low level of about two per cent until we get to farms grossing $100,000 per year and over. The largest category is farms grossing over $250,000 per year and in this group over 13 per cent use computers to help manage their farm business! In fact, even though they comprise only 4.9 per cent of Alberta's farms, they account for 22 per cent of the farm computers!



Stats Canada 1986 Census of Agriculture

VOLUME VIII, NO. 11, JANUARY, 1988

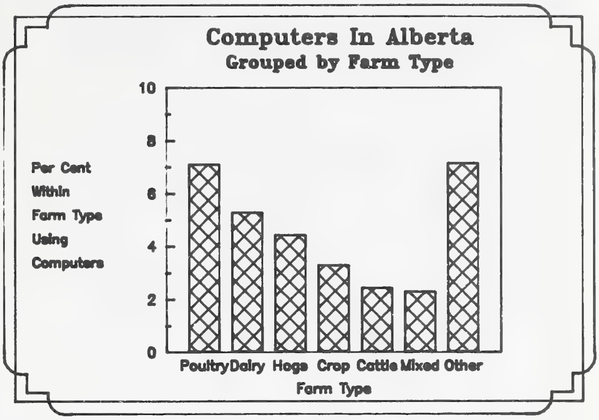
WHEN DOES A COMPUTER PAY?

Over the past few months we have been looking at several of the factors that influence computer use in agriculture. In November we presented a graph that showed that the use of computers increased as the gross income of the farm increased. This makes sense for at least two reasons:

1) There is more paper to handle.
2) There is more emphasis on the "business" aspects of farming.

This month we have some information about uses of computers on different kinds of farms. The graph is derived from statistics supplied to us by Statistics Canada from the 1986 Census of Agriculture. As you can see there is a definite difference between kinds of farms. The greatest users are poultry farms, followed by dairy and then hog farms. This also makes sense since poultry farms are highly specialized and typically have larger amounts of production data to handle and a more even cashflow. The same is true for dairy and hog farms.

LESSON NUMBER ONE - Computers are effective tools for processing large amounts of paper (data).



VOLUME VIII, NO. 12, FEBRUARY, 1988

BUYING A FARM COMPUTER - AN UPDATE

We have recently had a lot of calls from people planning to purchase a personal computer. While we have covered this topic before, new developments make this a good time for another look at how to purchase a computer.

WHAT TYPE SHOULD I BUY? - There are currently seven main lines of personal computers being sold: Apple II, Apple MacIntosh, Atari, Commodore Amiga, Commodore C64, IBM PC compatibles, and IBM PS/2.

For farm management applications, an IBM PS/2 or IBM PC compatible computer is really the only choice. The reason: **the vast majority (90%+) of software for farm business management is available only for IBM compatible computers.** No other type of computer offers as many choices when it comes to agricultural management software.

When IBM introduced its original PC in 1981, it set a standard in the microcomputer industry which is still being followed. The PC quickly dominated as the personal computer of choice in the business world including agriculture. Software developers immediately saw the advantage of writing programs for a reliable, standardized, well-supported computer like the PC. The vast majority of software available today will run on a PC purchased in 1981, which is phenomenal longevity for a computer design.

Because of the popularity of the IBM PC, other manufacturers found it more profitable to build computers which could take advantage of the software available for the PC than to design their own from scratch. These computers, built by companies other than IBM but using the same software and accessories as the PC, are known as "clones" or IBM compatibles. Computers like the Compaq, Tandy, Epson, AST, Samsung, or Packard Bell fall into this category.

The situation became more complicated in April of 1987 when IBM introduced its PS/2 line of computers. While these machines will run all of the programs available for the original PC, they also contain features which provide additional capabilities. These features, however, are still largely un--utilized by the software currently available. IBM has discontinued the production of the original IBM PC, PC/XT, PC/AT, and PC/286.

WHAT CLASS OF COMPUTER SHOULD I BUY? - Within the category of IBM compatible computers, there are currently three classes available:

PC/XT COMPATIBLES: These computers use the Intel 8088, 8086, or 80186 processor and are limited to a maximum of 640k memory. They include such models as: IBM PS/2 models 25 and 30; Tandy 1000 HX, 1000 SX, 1000 EX; Zenith Eazy PC; Epson Equity I+; Packard Bell XT; most "Turbo" PC compatibles.

These are the least expensive of the machines currently available and are suitable for word processing, accounting and other low-power computing chores. Their main limitation is potential obsolescence. Many of the newer software packages require additional memory and faster processing speeds which are provided by an AT class machine, so there will inevitably be software that these older machines will not be able to use. There is still a huge amount of good quality software available for these computers, however. A computer of the PC/XT class will meet the computing needs of most farm operations, as long as you are willing to pass up the opportunity to use some of the newer applications becoming available.

AT COMPATIBLES: These computers use the Intel 80286 or 80386 processor and can support very large amounts of memory. They perform 8 to 20 times faster than the original IBM PC but cost substantially more. Models in this category include: Tandy 1000 TX, 3000, 3000 HL, and 4000; Compaq Deskpro 286, Deskpro 386/20, and Portable; AST Premium /286; Wyse 286 AT; Samsung AT.

The AT class is rapidly becoming the standard business computer. Its high speed and memory capacity has allowed the development of faster, easier to use programs. If you intend to develop large spreadsheets or do intensive number crunching, you will want to look at an AT class computer.

Purchasing an AT class computer will ensure that your system will not become obsolete in the near future, especially if you purchase one of the machines with a 80386 processor. This must be balanced against the higher initial cost of these machines. It is important to note that a computer in this category will be necessary to run OS/2, the new operating system from Microsoft. PC/XT type machines will not be able to use OS/2 and the software which is developed for the new operating system.

IBM PS/2 COMPUTERS: The current line of IBM personal computers (IBM PS/2 models 50, 60 and 80) are distinct enough from their predecessors to warrant a separate category. Note that the PS/2 models 25 and 30 **do not** fit into this category, since they are much more similar to the PC/XT than they are to their PS/2 cousins.

Functionally, the IBM PS/2 models 50, 60 and 80 fall into the same category as the AT class machines. That is, they run the same software and are capable of running OS/2. However, the PS/2 machines have two important differences; VGA graphics and the Micro Channel bus. VGA stands for Video Graphics Array and is the new color graphics standard in high end IBM personal computers. The VGA standard is much improved over previous standards but is more expensive since it requires a very high quality monitor. Several manufacturers are set to release VGA cards which will allow current PCs and ATs to make use of VGA standard graphics.

The Micro Channel replaces the bus which is used in current PCs and ATs. The Micro Channel's advantage is faster operation and the support of multiple processors. Current expansion cards (e.g. modems, memory expansion, etc.) cannot be used with the Micro Channel, which means there will initially be additional cost and limited selection in Micro Channel expansion cards.

Many of the new features of the IBM PS/2 models 50, 60, and 80 are designed with the needs of large business in mind. For most farm users, the technical advantages of these machines are not worth their additional cost. The high level of service and quality provided with an IBM computer are a big plus for these machines.

SO WHICH ONE DO I BUY? - The advantages/disadvantages of each category of machine are summarized in the following table .

	PC/XT	AT	PS/2
Cost	Low	Medium	High
	$1500	$2500	$4000
Speed	Slow	Fast	Fast
	1.0	10.0	20.0
Technology	Old	New	Newest
	1981	1985	1987
Poocesser	8088/86	80286/386	80286/386
Memory	640k	16M	16M
Bus	8 bit	16 bit	Micro Channel

In summary, the purchase of an inexpensive XT type machine is a worthwhile investment as long as you know what you want to use the computer for and are satisfied with the software currently available. The purchase of an AT type machine, however, will provide the ability to use all of the new software which will become available in the coming years.

THE AMIGA 2000 WITH BRIDGE CARD

What is it about the Amiga? Every time one comes into our office it has a hard time leaving. There is never a shortage of people who want to adopt it and give it a loving home for the weekend... a week... a month.... Quite simply, the Amiga is the most fun we have had with a computer since... since... well, the last time we had an Amiga.

The first Amiga we looked at was the Amiga 1000 in October, 1985. Our conclusion was that it was an exciting new technology, but that its impact on the agricultural market would be small, due to its limited ability to run IBM software. True, it did have a product called The Transformer that let it run some IBM software, but most programs were intolerably slow, and would only work in monochrome, text (non-graphics) mode.

The Amiga 2000 is the latest version of the Amiga, and the reason we chose to look at it again was because of the BridgeBoard A2088 that is available for it. The BridgeBoard claims to let The Amiga 2000 run all software for the IBM PC. How well does it accomplish this task? We'll get to that at the end of the article, but first, let's update the Amiga 2000.

THE AMIGA - It is often easy to forget what fun computers can be. One of the packages sent to us by those sly folks at the Softwarehouse was a demonstration from NewTech that let us know just how much the Amiga is capable of. NewTech makes three products of note: DigiView, DigiPaint, and DigiF/X. These three packages let you take images from a video camera, modify colors and shapes, and even make animated shows complete with soundtracks. The demo disks were simply astounding. Any time we started up the demo, a group of people would quickly assemble to watch and listen. The audio and visual images that can be created with this system would go far towards making an unforgettable presentation anywhere. We are told that many "rock videos" are produced using this type of system.

Other software lent to us included: Marble Madness, Deluxe Paint, Deluxe Music Construction Set, and our old favorite - MindWalker.

Marble Madness soon became the new favorite game in our office and the reason why is simple. It presents excellent quality graphics, with an ascending scale of difficulty and interfaces this all to the user with a mouse. The mouse gave very sure control over the marble as it "rolled" along the playing surface. In fact, it was such a logical way of controlling the marble that even my four year old, who has never played this type of game before, had no problem beating clutzy old dad. (P.S. - the PC version of Marble Madness is nowhere near as good.)

Deluxe Paint is a drawing program that uses the graphics ability of the Amiga to its fullest. The effects that can be created using the 320 by 400 mode with 4096 colors are amazing. We had a textile design instructor from Olds College look at this package, and she was very impressed with the possibilities that it presents. Artists take note.

THE BRIDGEBOARD - is a single board that combines an 8088 CPU running at 4.77 Mhz, a socket for an 8087 math coprocessor, a disk controller, and a connector for a disk drive. With it, the Amiga promises complete compatibility with hardware and software for the IBM PC. How well does it accomplish this task? Quite well, actually! We had more problems with Amiga 1000 software than we did with PC software. We tried all the software that we normally use including Lotus 123, Turbo Pascal 4.0, Flight Simulator, Procomm, KnowledgeMan, Space Quest II, and the PC Magazine Benchmarks. It ran everything flawlessly with one exception. One benchmark test involves a very fast test of "blitzing" characters to the screen. Nothing appeared to happen at all in this test, but it is such a non-standard type of thing to even try that we discount this failure.

The rest of the benchmark tests showed that the BridgeBoard performs at exactly the same speed as a normal PC. Of course, in this era of "turbo" PCs, that's getting to be a little slow. Disk access was also slow, but to counter that, we used the memory in the Amiga as a ram disk to speed things up. An 80286 based BridgeBoard is rumoured.

One neat thing that we could do was to start a job such as database indexing in the PC window and let it run. We could then go back to the Amiga windows, and let the PC window run in the background, without any reduction in speed. Now that's something that even an AT with OS/2 cannot yet handle!

SO HERE IT IS - Two computers in one, giving the advantages of both. You can run all of your favorite business software and still have fun. The big question though - is it worth it? The Amiga 2000 with 1 meg of ram, hi-res color monitor, and one 3.5 inch disk drive sells for about $2900. Add to that a second 3.5 inch disk drive for $400; and the BridgeBoard and a 5.25 inch drive for $600 (please note: to purchase the BridgeBoard separately costs $750; the $600 price is only if it is purchased with the Amiga), and you have a system for $3900. Of course, complete PC systems can be purchased for as little as $1500. So, is it worth it? If you were going to purchase the Amiga anyway, then $600 to gain the extra functionality is well worth it. If you are looking at this solely as an alternative to a PC, then it probably isn't worth it. Special thanks to the SoftwareHouse (West) Inc., 12439 Stony Plain Road, Edmonton, AB, T5N 3N3, (403)482-4388, for the loan of the Amiga.

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